

Vitramon[®]

Commitment to Excellence



Monolithic Ceramic Chip Capacitors

Distributed By



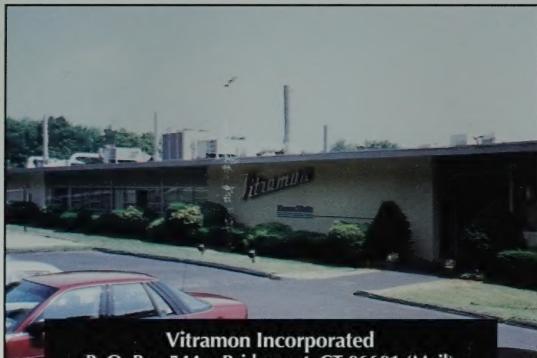
TRITECH
ELECTRONIC
DISTRIBUTING

P.O. BOX 157
516-678-6224

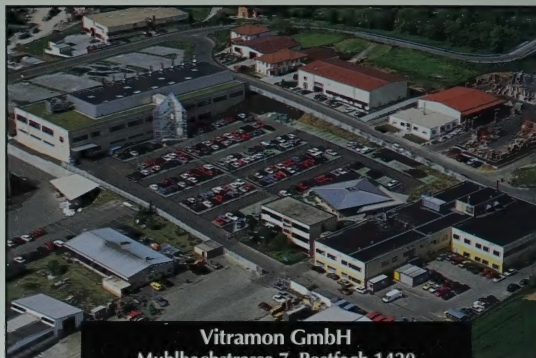
OCEANSIDE, NY 11572
TWX, 510-225 3693

Thomas & Betts

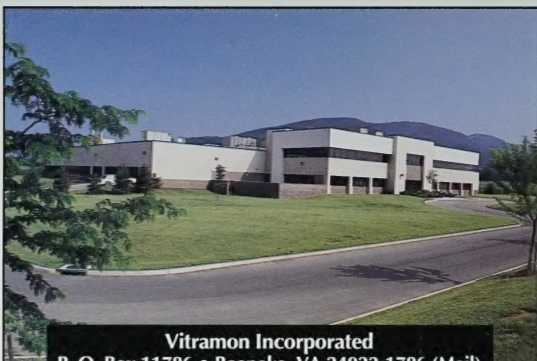
Vitramon® Commitment to Excellence



Vitramon Incorporated
P. O. Box 544 • Bridgeport, CT 06601 (Mail)
10 Route 25 • Monroe, CT 06468 (Ship)
TEL: (203) 268-6261 • FAX: (203) 452-5670



Vitramon GmbH
Mühlbachstrasse 7, Postfach 1420
7150 Backnang-Waldrems, Germany
TEL: 011- 49-7191-8050
FAX: 011- 49-7191-8140



Vitramon Incorporated
P. O. Box 11786 • Roanoke, VA 24022-1786 (Mail)
Roanoke Centre for Industry and Technology
3425 Chip Drive, NE • Roanoke, VA 24012 (Ship)
TEL: (703) 982-6706 • FAX: (703) 342-8652



Vitramon France S.A.R.L.
Zi Sud - Rue Copernic • BP 113
41100 Vendôme, France
TEL: 011-33-5423-5423
FAX: 011-33-5480-2092



Vitramon do Brasil Ltda.
Rua Carmo do Rio Verde N#511
Varzea De Baixo - Sao Paulo - SpCEP 04729 - Brasil
TEL: 011-55-11-523-6333
FAX: 011-55-11-523-6041



Vitramon Limited
Wycombe Lane, Woburn Green
Bucks HP10 0HH England
TEL: 011-44-6285-24933
FAX: 011-44-6285-25435

Vitramon® Worldwide Sales Locations...

For more details on Vitramon Capacitors contact your nearest Vitramon Sales Representative.

VITRAMON U.S.A. LOCATIONS

AL Huntsville	Twentieth Century Marketing	(205) 772-9999
AZ Scottsdale	Lindberg Company	(602) 998-2944
AZ Scottsdale	Vitramon Western Sales Office	(602) 951-0091
CA Escondido	Eagle Technical Sales	(619) 743-6550
CA San Jose	Eclipse Sales	(408) 437-7575
CA Santa Ana	Jones & McGeoy Sales	(714) 547-6466
CO Englewood	Compass Marketing & Sales	(303) 721-9663
CT Branford	Coakley Boyd & Abbett	(203) 481-2218
CT Monroe	Vitramon Northeast Region	(203) 268-6261
FL Coral Springs	Graham Associates	(305) 341-5102
FL Dade City	Graham Associates	(904) 523-0996
FL Melbourne	Graham Associates	(407) 773-6631
FL Palm Beach Gardens	Graham Associates	(407) 622-4049
FL Winter Garden	Graham Associates	(407) 656-9369
GA Norcross	Twentieth Century Marketing	(404) 446-1999
IL Skokie	Industrial Representatives	(708) 967-8430
IN Fort Wayne	Electro Reps.	(219) 489-8205
IN Indianapolis	Electro Reps.	(317) 842-7202
KS Olathe	Rothkopf & Associates	(913) 829-8897
MA Framingham	Coakley Boyd & Abbett	(508) 820-0800
MA West Bridgewater	Coakley Boyd & Abbett	(508) 559-6700
MD Baltimore	Eastern Components	(410) 788-7050
MI Farmington Hills	Vitramon Sales Office	(313) 477-7622
MI Troy	C.B. Jensen & Associates	(313) 643-0506
MN Bloomington	Horizon Technologies	(612) 884-6515
MO St. Louis	Rothkopf & Associates	(314) 961-4485
NC Raleigh	Tingen Technical Sales	(919) 870-6670
NY Great Neck	MOS Marketing Associates	(516) 487-3966
NY Pittsford	Leonard D. Allen	(716) 377-3554
NY Syracuse	Leonard D. Allen	(315) 437-8387
OK Tulsa	Comptech Sales	(918) 266-1966
OR Beaverton	Electronic Sources	(503) 627-0838
PA Norristown	Eastern Components	(215) 270-9530
SC Conway	Vitramon Southern Sales Office	(803) 248-6699
TN Knoxville	Twentieth Century Marketing	(615) 539-0887
TX Austin	Comptech Sales	(512) 343-0523
TX El Paso	Comptech Sales	(915) 590-4591
TX Houston	Comptech Sales	(713) 492-0005
TX Irving	Comptech Sales	(214) 751-1181
UT Salt Lake City	Compass Marketing Sales	(801) 264-6606
WA Bellevue	Electronic Sources	(206) 451-3500
WI Brookfield	Industrial Representatives	(414) 789-9393

VITRAMON CANADIAN LOCATIONS

Mississauga, Ontario	Longman Sales	(416) 670-8100
Kirkland, Quebec	Longman Sales	(514) 694-3911
Nepean, Ontario	Longman Sales	(613) 564-0100
Calgary, Alberta	Longman Sales	(403) 228-8719

VITRAMON EUROPEAN LOCATIONS

England	Vitramon Limited	011-44-628524933
Germany	Vitramon GmbH	011-49-71918050
France	Vitramon France	011-33-54235423

CONTENTS

Contents, Sales Offices	1
NPO (COG) Dielectric	2, 3
X7R Dielectric	4, 5
Z5U Dielectric	6, 7
BX Dielectric	8, 9
High Operating Temperature X8R Dielectric	10, 11
High Voltage and Surge Suppression Capacitors NPO Dielectric	12, 13
High Voltage and Surge Suppression Capacitors X7R Dielectric	14, 15
High Q Dielectric	16, 17
CDR MIL-C-55681	18
CDR BP/BX Dielectric CDR01/02/03/04/06	19
CDR BP/BX Dielectric – CDR31	20
CDR BP/BX Dielectric – CDR32	21
CDR BP/BX Dielectric – CDR33/34/35	22
Low Profile Decoupling Capacitors	23
Chip Kits	24
Bar Code Label Standards	25
Packaging/E.I.A. Marking Options	26
Application Notes	27

VITRAMON – JAPAN

Tokyo	Vitramon Japan Limited	011-81-337001369
-------	------------------------	------------------

VITRAMON FAR EAST LOCATIONS

Hong Kong	Astec Agencies	011-852-4873987
Korea	Wonil Digital Tech	011-82-25235473
Taiwan	ACT-RX Tech	011-886-2-9341179
Singapore	Compotech	011-65-7437491

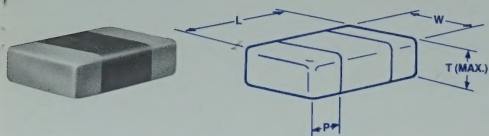
VITRAMON AUSTRALIA

Auburn	Vitramon Pty. Limited	011-61-26461888
--------	-----------------------	-----------------

VITRAMON BRAZIL

Sao Paulo	Vitramon do Brasil Ltda.	011-55-11-5236333
-----------	--------------------------	-------------------

NPO (COG) DIELECTRIC



Dimensional Tolerances – Inch (mm)

Type	L&W	Type	L&W
0603	±.005 (±0.12)	1812	±.010 (±0.25)
0805	±.008 (±0.2)	1825	±.010 (±0.25)
1206	±.008 (±0.2)	2225	±.010 (±0.25)
1210	±.008 (±0.2)		
1808	±.010 (±0.25)		

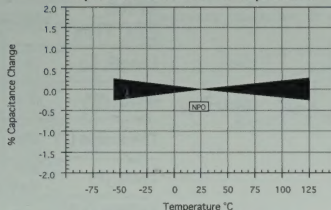
PART NUMBERING SYSTEM

VJ0805	Style																			
A	Temperature Characteristic A = NPO																			
101	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. An "R" denotes a decimal point in which case all figures are significant. (See Cap. Code)																			
K	Capacitance Tolerance B = ± 0.10 pF E = ± 0.5% J = ± 5% C = ± 0.25pF F = ± 1% K = ± 10% D = ± 0.5pF G = ± 2%																			
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish																			
A	VOLTAGE A = 50v B = 100v																			
A	<table><tr><th rowspan="2">MARKING OPTION</th><th>Use Code "A"</th><th colspan="2">Use Code "M"</th></tr><tr><th>"No Mark"</th><th>Marked per E.I.A. (See pg. 26)</th><th>Marked Vendor (V) Plus E.I.A. Mark</th></tr><tr><td>0603</td><td>✓</td><td></td><td></td></tr><tr><td>0805</td><td>✓</td><td>✓</td><td></td></tr><tr><td>All Other Sizes</td><td>✓</td><td></td><td>✓</td></tr></table>	MARKING OPTION	Use Code "A"	Use Code "M"		"No Mark"	Marked per E.I.A. (See pg. 26)	Marked Vendor (V) Plus E.I.A. Mark	0603	✓			0805	✓	✓		All Other Sizes	✓		✓
MARKING OPTION	Use Code "A"		Use Code "M"																	
	"No Mark"	Marked per E.I.A. (See pg. 26)	Marked Vendor (V) Plus E.I.A. Mark																	
0603	✓																			
0805	✓	✓																		
All Other Sizes	✓		✓																	
T	PACKAGING OPTION Standard is Bulk T = 7" Reel R = 13" Reel B = Bulk W = Waffle (See pg. 26)																			

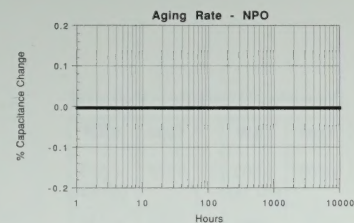
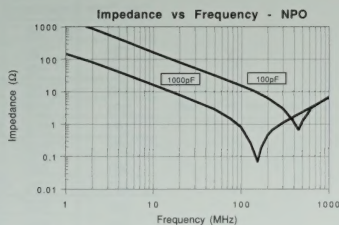
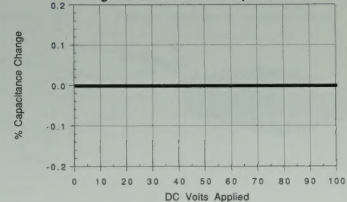
STYLE	VJ0603	VJ0805	VJ1206	VJ1210	VJ1808
E.I.A. TYPE	0603	0805	1206	1210	1808
Length (L)	.063 (1.60)	.079 (2.00)	.126 (3.20)	.126 (3.20)	.180 (4.57)
Width (W)	.031 (0.80)	.049 (1.25)	.063 (1.60)	.098 (2.50)	.080 (2.03)
Thickness (T) Max	.035 (0.89)	.051 (1.30)	.059 (1.50)	.067 (1.70)	.065 (1.65)
Term. (P) Min Max	.005 (.12) .015 (.38)	.010 (.25) .028 (.71)	.010 (.25) .028 (.71)	.010 (.25) .028 (.71)	.010 (.25) .030 (.76)
Voltage (Vdc)	50 100	50 100	50 100	50 100	50 100
Cap. Code	Capacitance				
1R0	pF 1.0				
1R2	1.2				
1R5	1.5				
1R8	1.8				
2R2	2.2				
2R7	2.7				
3R3	3.3				
3R9	3.9				
4R7	4.7				
5R6	5.6				
6R8	6.8				
8R2	8.2				
100	10				
120	12				
150	15				
180	18				
220	22				
270	27				
330	33				
390	39				
470	47				
560	56				
680	68				
820	82				
101	100				
121	120				
151	150				
181	180				
221	220				
271	270				
331	330				
391	390				
471	470				
561	560				
681	680				
821	820				
102	1000				
122	1200				
152	1500				
182	1800				
222	2200				
272	2700				
332	3300				
392	3900				
472	4700				
562	5600				
682	6800				
822	8200				
103	µF .010				
123	.012				
153	.015				
183	.018				
223	.022				
273	.027				
333	.033				
393	.039				
473	.047				
563	.056				

STYLE	VJ1812	VJ1825*	VJ2225*
E.I.A. TYPE	1812	1825	
Length (L)	.177 (4.50)	.177 (4.50)	.220 (5.59)
Width (W)	.126 (3.20)	.252 (6.40)	.250 (6.35)
Thickness (T) Max	.067 (1.70)	.067 (1.70)	.070 (1.78)
Term. (P) Min	.010 (.25)	.010 (.25)	.010 (.25)
Max	.030 (.76)	.030 (.76)	.030 (.76)
Voltage (Vdc)	50 100	50 100	50 100
Cap. Code	Capacitance		
1R0	pF 1.0		
1R2	1.2		
1R5	1.5		
1R8	1.8		
2R2	2.2		
2R7	2.7		
3R3	3.3		
3R9	3.9		
4R7	4.7		
5R6	5.6		
6R8	6.8		
8R2	8.2		
100	10		
120	12		
150	15		
180	18		
220	22		
270	27		
330	33		
390	39		
470	47		
560	56		
680	68		
820	82		
101	100		
121	120		
151	150		
181	180		
221	220		
271	270		
331	330		
391	390		
471	470		
561	560		
681	680		
821	820		
102	1000		
122	1200		
152	1500		
182	1800		
222	2200		
272	2700		
332	3300		
392	3900		
472	4700		
562	5600		
682	6800		
822	8200		
103	μF .010		
123	.012		
153	.015		
183	.018		
223	.022		
273	.027		
333	.033		
393	.039		
473	.047		
563	.056		

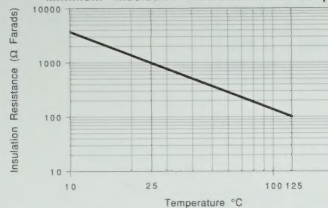
Temperature Coefficient of Capacitance



Voltage Coefficient of Capacitance - NPO



Minimum Insulation Resistance vs Temperature



NPO (COG) Dielectric General Specifications

Capacitance Range: 1.0 pF to .056 μF.

Operating Temperature Range: -55°C to +125°C.

Temperature Characteristic: 0 ± 30 ppm/°C.

Voltage Ratings: 50, 100 Vdc @ +125°C.

Dissipation Factor: 0.1% (max.) @ +25°C and +125°C @ 1.0 Vrms and 1 kHz for >1000 pF. 1 MHz for 1000 pF.

Insulation Resistance @ +25°C and rated Vdc:

100,000 megohms (min.) or 1000 ohm-farads (min.), whichever is less.

Insulation Resistance @ +125°C and rated Vdc:

10,000 megohms (min.) or 100 ohm-farads (min.), whichever is less.

Dielectric Withstanding Voltage: 250% of rated voltage for 5 ± 1 seconds, 50 milliamps (max.).

Unless otherwise specified all test data is at +25°C

Capacitance Tolerances

B = ± 0.1 pF (1 to 10 pF)

F = ± 1% (10 pF)

C = ± 0.25 pF (1.0 to 25 pF)

G = ± 2% (5 pF)

D = ± 0.50 pF (1.0 to 50 pF)

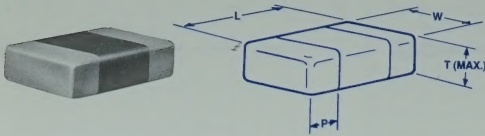
J = ± 5% (2 pF)

E = ± 0.5% (20 pF)

K = ± 10% (1 pF)

* IR and Vapor Phase soldering only recommended.

X7R DIELECTRIC



Dimensional Tolerances – Inch (mm)

Type	L&W	Type	L&W
0603	±.005 (±0.12)	1812	±.010 (±0.25)
0805	±.008 (±0.2)	1825	±.010 (±0.25)
1206	±.008 (±0.2)	2225	±.010 (±0.25)
1210	±.008 (±0.2)	3640	±.015 (±0.38)
1808	±.010 (±0.25)		

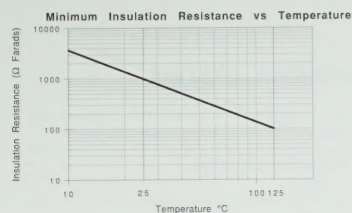
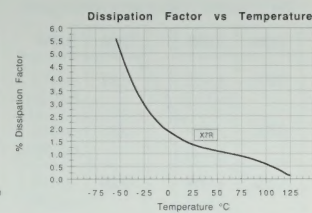
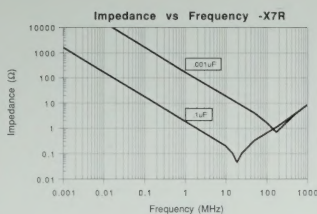
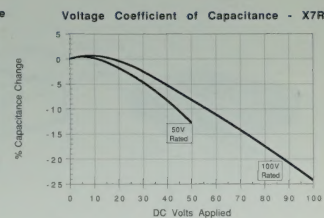
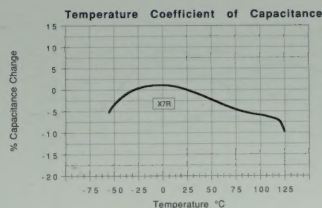
PART NUMBERING SYSTEM

VJ0805	Style																
Y	Temperature Characteristic Y = X7R																
103	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. (See Cap. Code)																
K	Capacitance Tolerance J = ± 5% K = ± 10% M = ± 20%																
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish																
A	VOLTAGE X = 25v A = 50v B = 100v																
A	MARKING OPTION <table><tr><th></th><th>Use Code "A" "No Mark"</th><th>Use Code "M" Marked per E.I.A. (See pg. 26)</th><th>Use Code "V" Marked Vendor (V) Plus E.I.A. Mark</th></tr><tr><td>0603</td><td>✓</td><td></td><td></td></tr><tr><td>0805</td><td>✓</td><td>✓</td><td></td></tr><tr><td>All Other Sizes</td><td>✓</td><td></td><td>✓</td></tr></table>		Use Code "A" "No Mark"	Use Code "M" Marked per E.I.A. (See pg. 26)	Use Code "V" Marked Vendor (V) Plus E.I.A. Mark	0603	✓			0805	✓	✓		All Other Sizes	✓		✓
	Use Code "A" "No Mark"	Use Code "M" Marked per E.I.A. (See pg. 26)	Use Code "V" Marked Vendor (V) Plus E.I.A. Mark														
0603	✓																
0805	✓	✓															
All Other Sizes	✓		✓														
T	PACKAGING OPTION Standard is Bulk T = 7" Reel R = 13" Reel B = Bulk W = Waffle (See pg. 26)																

STYLE	VJ0603	VJ0805	VJ1206	VJ1210	VJ1808
E.I.A. TYPE	0603	0805	1206	1210	
Length (L)	.063 (1.60)	.079 (2.00)	.126 (3.20)	.126 (3.20)	.180 (4.57)
Width (W)	.031 (0.80)	.049 (1.25)	.063 (1.60)	.098 (2.50)	.080 (2.03)
Thickness (T) Max	.035 (0.89)	.051 (1.30)	.059 (1.50)	.067 (1.70)	.065 (1.65)
Term. (P)	Min .005 (.12) Max .015 (.38)	Min .010 (.25) Max .028 (.71)	Min .010 (.25) Max .028 (.71)	Min .010 (.25) Max .028 (.71)	Min .010 (.25) Max .030 (.76)
Voltage (Vdc)	25 50 100	25 50 100	25 50 100	25 50 100	50 100
Cap. Code	Capacitance				
101	pF 100				
121	120				
151	150				
181	180				
221	220				
271	270				
331	330				
391	390				
471	470				
561	560				
681	680				
821	820				
102	1000				
122	1200				
152	1500				
182	1800				
222	2200				
272	2700				
332	3300				
392	3900				
472	4700				
562	5600				
682	6800				
822	8200				
103	μF .010				
123	.012				
153	.015				
183	.018				
223	.022				
273	.027				
333	.033				
393	.039				
473	.047				
563	.056				
683	.068				
823	.082				
104	.10				
124	.12				
154	.15				
184	.18				
224	.22				
274	.27				
334	.33				
394	.39				
474	.47				
564	.56				
684	.68				
824	.82				
105	1.0				
125	1.2				
155	1.5				
185	1.8				
225	2.2				
275	2.7				
335	3.3				
395	3.9				
475	4.7				
565	5.6				
685	6.8				

STYLE		VJ1812	VJ1825*	VJ2225*	VJ3640*
E.I.A. TYPE		1812	1825		
Length (L)		.177 (4.50)	.177 (4.50)	.220 (5.59)	.360 (9.14)
Width (W)		.126 (3.20)	.252 (6.40)	.250 (6.35)	.400 (10.20)
Thickness (T)	Max	.067 (1.70)	.067 (1.70)	.070 (1.78)	.071 (1.80)
Term. (P)	Min Max	.010 (.25) .030 (.76)	.010 (.25) .030 (.76)	.010 (.25) .030 (.76)	.030 (.76) .050 (1.27)
Voltage (Vdc)		25 50 100	50 100	25 50 100	25 50 100
Cap. Code	Capacitance				
101	pF 100				
121	120				
151	150				
181	180				
221	220				
271	270				
331	330				
391	390				
471	470				
561	560				
681	680				
821	820				
102	1000				
122	1200				
152	1500				
182	1800				
222	2200				
272	2700				
332	3300				
392	3900				
472	4700				
562	5600				
682	6800				
822	8200				
103	μ F .010				
123	.012				
153	.015				
183	.018				
223	.022				
273	.027				
333	.033				
393	.039				
473	.047				
563	.056				
683	.068				
823	.082				
104	.10				
124	.12				
154	.15				
184	.18				
224	.22				
274	.27				
334	.33				
394	.39				
474	.47				
564	.56				
684	.68				
824	.82				
105	1.0				
125	1.2				
155	1.5				
185	1.8				
225	2.2				
275	2.7				
335	3.3				
395	3.9				
475	4.7				
565	5.6				
685	6.8				

* IR and Vapor Phase soldering only recommended.



X7R Dielectric General Specifications

Capacitance Range: 470 pF to 6.8 μ F.

Capacitance Tolerances: $\pm 5\%$, $\pm 10\%$ and $\pm 20\%$

Operating Temperature Range: -55°C to $+125^{\circ}\text{C}$.

Temperature Characteristic: $\pm 15\%$ with 0 Vdc applied

Voltage Ratings: 25, 50, 100 Vdc @ $+125^{\circ}\text{C}$.

Dissipation Factor:

50v, 100v ratings, 2.5% (max.) @ 1.0 Vrms and 1 kHz

25v ratings, 2.5% (max.) @ 0.5 Vrms and 1 kHz

Insulation Resistance @ $+25^{\circ}\text{C}$ and rated Vdc:

100,000 megohms (min.) or 1000 ohm-farads (min.), whichever is less.

Insulation Resistance @ $+125^{\circ}\text{C}$ and rated Vdc:

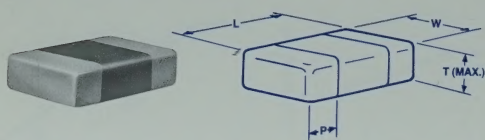
10,000 megohms (min.) or 100 ohm-farads (min.), whichever is less.

Dielectric Withstanding Voltage: 250% of rated voltage for 5 ± 1 seconds, 50 milliamps (max.).

Aging Rate: 1% (maximum) per decade

Unless otherwise specified all test data is at $+25^{\circ}\text{C}$

Z5U DIELECTRIC



Dimensional Tolerances – Inch (mm)

Type	L&W	Type	L&W
0603	±.005 (±0.12)	1812	±.010 (±0.25)
0805	±.008 (±0.2)	1825	±.010 (±0.25)
1206	±.008 (±0.2)	2225	±.010 (±0.25)
1210	±.008 (±0.2)	3640	±.015 (±0.38)
1808	±.010 (±0.25)		

PART NUMBERING SYSTEM

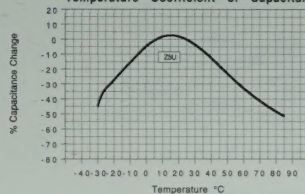
VJ0805	Style																			
U	Temperature Characteristic U = Z5U																			
103	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. (See Cap. Code)																			
M	Capacitance Tolerance M = ± 20% Z = + 80%, - 20% P = + 100%, - 0%																			
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish																			
A	VOLTAGE X = 25v, A = 50v																			
A	<table><tr><th rowspan="2">MARKING OPTION</th><th>Use Code "A"</th><th colspan="2">Use Code "M"</th></tr><tr><th>"No Mark"</th><th>Marked per E.I.A. (See pg. 26)</th><th>Marked Vendor (V) Plus E.I.A. Mark</th></tr><tr><td>0603</td><td>✓</td><td></td><td></td></tr><tr><td>0805</td><td>✓</td><td>✓</td><td></td></tr><tr><td>All Other Sizes</td><td>✓</td><td></td><td>✓</td></tr></table>	MARKING OPTION	Use Code "A"	Use Code "M"		"No Mark"	Marked per E.I.A. (See pg. 26)	Marked Vendor (V) Plus E.I.A. Mark	0603	✓			0805	✓	✓		All Other Sizes	✓		✓
MARKING OPTION	Use Code "A"		Use Code "M"																	
	"No Mark"	Marked per E.I.A. (See pg. 26)	Marked Vendor (V) Plus E.I.A. Mark																	
0603	✓																			
0805	✓	✓																		
All Other Sizes	✓		✓																	
T	PACKAGING OPTION Standard is Bulk T = 7" Reel R = 13" Reel B = Bulk W = Waffle (See pg. 26)																			

STYLE	VJ0603	VJ0805	VJ1206	VJ1210
E.I.A. TYPE	0603	0805	1206	1210
Length (L)	.063 (1.60)	.079 (2.00)	.126 (3.20)	.126 (3.20)
Width (W)	.031 (0.80)	.049 (1.25)	.063 (1.60)	.098 (2.50)
Thickness (T) Max	.035 (1.89)	.051 (1.30)	.059 (1.50)	.067 (1.70)
Term. (P)	Min Max	.005 (.12) .015 (.38)	.010 (.25) .028 (.71)	.010 (.25) .028 (.71)
Voltage (Vdc)	25	50	25	50
Cap. Code	Capacitance			
103	μF .010			
123	.012			
153	.015			
183	.018			
223	.022			
273	.027			
333	.033			
393	.039			
473	.047			
563	.056			
683	.068			
823	.082			
104	.10			
124	.12			
154	.15			
184	.18			
224	.22			
274	.27			
334	.33			
394	.39			
474	.47			
564	.56			
684	.68			
824	.82			
105	1.0			
125	1.2			
155	1.5			
185	1.8			
225	2.2			
275	2.7			
335	3.3			
395	3.9			
475	4.7			
565	5.6			
685	6.8			
825	8.2			
106	10.0			
126	12.0			
156	15.0			
186	18.0			

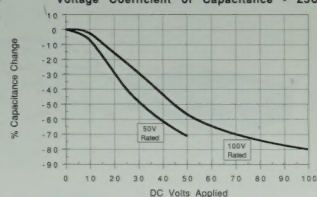
STYLE	VJ1812	VJ1825*	VJ2225*	VJ3640*
E.I.A. TYPE	1812	1825		
Length (L)	.177 (4.50)	.177 (4.50)	.220 (5.59)	.360 (9.14)
Width (W)	.126 (3.20)	.252 (6.40)	.250 (6.35)	.400 (10.20)
Thickness (T) Max	.067 (1.70)	.067 (1.70)	.070 (1.78)	.071 (1.80)
Term. (P)	Min Max	.010 (.25) .030 (.76)	.010 (.25) .030 (.76)	.030 (.76) .050 (1.27)
Voltage (Vdc)	25 50	50	25 50	25 50
Cap. Code	Capacitance			
103	μF .010			
123	.012			
153	.015			
183	.018			
223	.022			
273	.027			
333	.033			
393	.039			
473	.047			
563	.056			
683	.068			
823	.082			
104	.10			
124	.12			
154	.15			
184	.18			
224	.22			
274	.27			
334	.33			
394	.39			
474	.47			
564	.56			
684	.68			
824	.82			
105	1.0			
125	1.2			
155	1.5			
185	1.8			
225	2.2			
275	2.7			
335	3.3			
395	3.9			
475	4.7			
565	5.6			
685	6.8			
825	8.2			
106	10.0			
126	12.0			
156	15.0			
186	18.0			

* IR and Vapor Phase soldering only recommended.

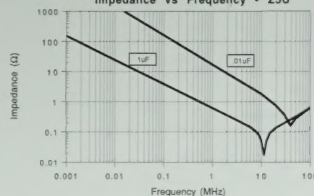
Temperature Coefficient of Capacitance



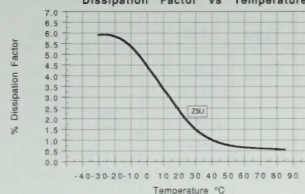
Voltage Coefficient of Capacitance - Z5U



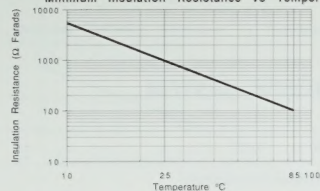
Impedance vs Frequency - Z5U



Dissipation Factor vs Temperature



Minimum Insulation Resistance vs Temperature



Z5U Dielectric General Specifications

Capacitance Range: .01 μF to 15 μF .

Capacitance Tolerances: $\pm 20\%$, $+80\%/-20\%$, and $100\%/-0\%$

Operating Temperature Range: $+10^\circ\text{C}$ to $+85^\circ\text{C}$.

Temperature Characteristic: $+22\%$, -56%

Voltage Ratings: 25, 50 Vdc @ $+85^\circ\text{C}$.

Dissipation Factor: 50v ratings, 3.0% (max.) @ .5 Vrms and 1 kHz
25v ratings, 3.5% (max.) @ .5 Vrms and 1 kHz

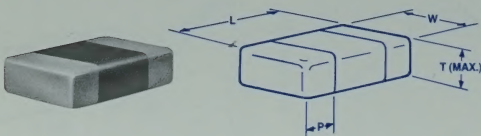
Insulation Resistance @ $+25^\circ\text{C}$ and rated Vdc:
100 ohm-farads (min.),

Dielectric Withstanding Voltage: 250% of rated voltage for
 5 ± 1 seconds, 50 milliamps (max.).

Aging Rate: 3% (maximum) per decade

Unless otherwise specified all test data is at $+25^\circ\text{C}$

BX DIELECTRIC



Dimensional Tolerances – Inch (mm)

Type	L&W	Type	L&W
0603	±.005 (±0.12)	1812	±.010 (±0.25)
0805	±.008 (±0.2)	1825	±.010 (±0.25)
1206	±.008 (±0.2)	2225	±.010 (±0.25)
1210	±.008 (±0.2)		
1808	±.010 (±0.25)		

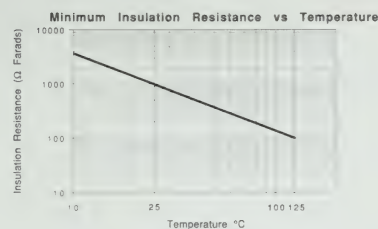
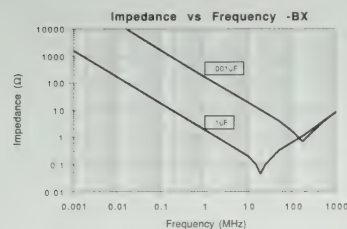
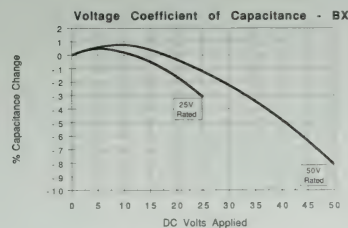
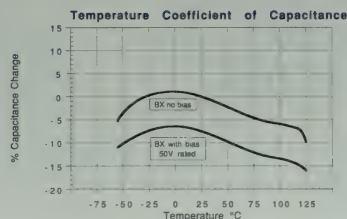
PART NUMBERING SYSTEM

VJ0805	Style																			
X	Temperature Characteristic X = BX																			
103	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. (See Cap. Code)																			
K	Capacitance Tolerance J = ± 5% K = ± 10% M = ± 20%																			
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish																			
A	VOLTAGE X = 25v, A = 50v B = 100v																			
A	MARKING OPTION <table><tr><th rowspan="2">MARKING OPTION</th><th>Use Code "A" "No Mark"</th><th colspan="2">Use Code "M"</th></tr><tr><th></th><th>Marked per E.I.A. (See pg. 26)</th><th>Marked Vendor (V) Plus E.I.A. Mark</th></tr><tr><td>0603</td><td>✓</td><td></td><td></td></tr><tr><td>0805</td><td>✓</td><td>✓</td><td></td></tr><tr><td>All Other Sizes</td><td>✓</td><td></td><td>✓</td></tr></table>	MARKING OPTION	Use Code "A" "No Mark"	Use Code "M"			Marked per E.I.A. (See pg. 26)	Marked Vendor (V) Plus E.I.A. Mark	0603	✓			0805	✓	✓		All Other Sizes	✓		✓
MARKING OPTION	Use Code "A" "No Mark"		Use Code "M"																	
		Marked per E.I.A. (See pg. 26)	Marked Vendor (V) Plus E.I.A. Mark																	
0603	✓																			
0805	✓	✓																		
All Other Sizes	✓		✓																	
T	PACKAGING OPTION Standard is Bulk T = 7" Reel R = 13" Reel B = Bulk W = Waffle (See pg. 26)																			

STYLE	VJ0603	VJ0805	VJ1206	VJ1210
E.I.A. TYPE	0603	0805	1206	1210
Length (L)	.063 (1.60)	.079 (2.00)	.126 (3.20)	.126 (3.20)
Width (W)	.031 (0.80)	.049 (1.25)	.063 (1.60)	.098 (2.50)
Thickness (T) Max	.035 (0.89)	.051 (1.30)	.059 (1.50)	.067 (1.70)
Term. (P) Min Max	.005 (.12) .015 (.38)	.010 (.25) .028 (.71)	.010 (.25) .028 (.71)	.010 (.25) .028 (.71)
Voltage (Vdc)	25 50	25 50 100	25 50 100	25 50 100
Cap. Code	Capacitance			
101	pF 100			
121	120			
151	150			
181	180			
221	220			
271	270			
331	330			
391	390			
471	470			
561	560			
681	680			
821	820			
102	1000			
122	1200			
152	1500			
182	1800			
222	2200			
272	2700			
332	3300			
392	3900			
472	4700			
562	5600			
682	6800			
822	8200			
103	μF .010			
123	.012			
153	.015			
183	.018			
223	.022			
273	.027			
333	.033			
393	.039			
473	.047			
563	.056			
683	.068			
823	.082			
104	.10			
124	.12			
154	.15			
184	.18			
224	.22			
274	.27			
334	.33			
394	.39			
474	.47			
564	.56			
684	.68			
824	.82			
105	1.0			

STYLE	VJ1808	VJ1812	VJ1825*	VJ2225*
E.I.A. TYPE		1812	1825	
Length (L)	.180 (4.57)	.177 (4.50)	.177 (4.50)	.220 (5.59)
Width (W)	.080 (2.03)	.126 (3.20)	.250 (6.35)	.250 (6.35)
Thickness (T) Max	.065 (1.65)	.067 (1.70)	.067 (1.70)	.070 (1.78)
Term. (P)	Min Max	.010 (.25) .030 (.76)	.010 (.25) .030 (.76)	.010 (.25) .030 (.76)
Voltage (Vdc)	25 50 100	25 50 100	25 50	25 50
Cap. Code	Capacitance			
101	pF 100			
121	120			
151	150			
181	180			
221	220			
271	270			
331	330			
391	390			
471	470			
561	560			
681	680			
821	820			
102	1000			
122	1200			
152	1500			
182	1800			
222	2200			
272	2700			
332	3300			
392	3900			
472	4700			
562	5600			
682	6800			
822	8200			
103	μ F .010			
123	.012			
153	.015			
183	.018			
223	.022			
273	.027			
333	.033			
393	.039			
473	.047			
563	.056			
683	.068			
823	.082			
104	.10			
124	.12			
154	.15			
184	.18			
224	.22			
274	.27			
334	.33			
394	.39			
474	.47			
564	.56			
684	.68			
824	.82			
105	1.0			

* IR and Vapor Phase soldering only recommended.



BX Dielectric General Specifications

Capacitance Range: 470 pF to 1.0 μ F.

Capacitance Tolerances: $\pm 5\%$, $\pm 10\%$ and $\pm 20\%$

Operating Temperature Range: -55°C to $+125^{\circ}\text{C}$.

Temperature Characteristic: $\pm 15\%$ at 0 Vdc, $+15\%$, -25% @ rated voltage

Voltage Ratings: 25, 50, 100 Vdc @ $+125^{\circ}\text{C}$.

Dissipation Factor: 2.5% (max.) @ 1.0 Vrms and 1 kHz

Insulation Resistance @ $+25^{\circ}\text{C}$ and rated Vdc:

100,000 megohms (min.) or 1000 ohm-farads (min.), whichever is less.

Insulation Resistance @ $+125^{\circ}\text{C}$ and rated Vdc:

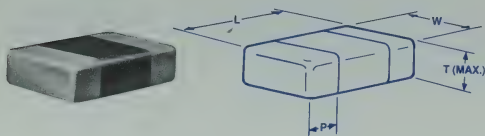
10,000 megohms (min.) or 100 ohm-farads (min.), whichever is less.

Dielectric Withstanding Voltage: 250% of rated voltage for 5 ± 1 seconds, 50 milliamps (max.).

Aging Rate: 1% (maximum) per decade

Unless otherwise specified all test data is at $+25^{\circ}\text{C}$

HIGH OPERATING TEMPERATURE X8R DIELECTRIC



Dimensional Tolerances – Inch (mm)

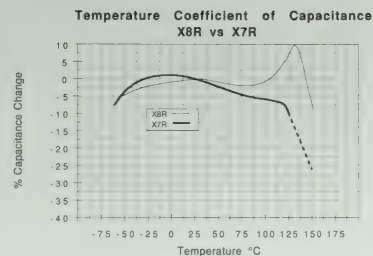
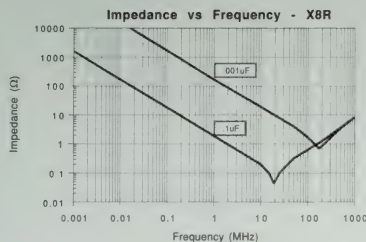
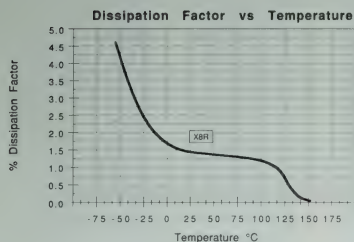
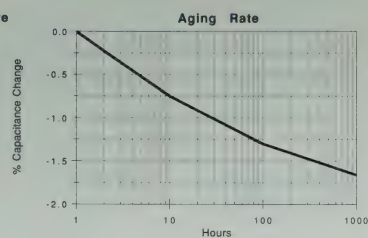
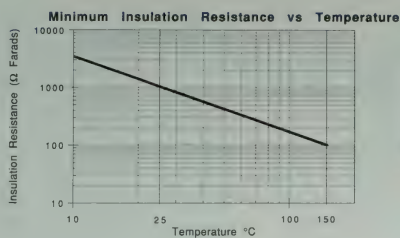
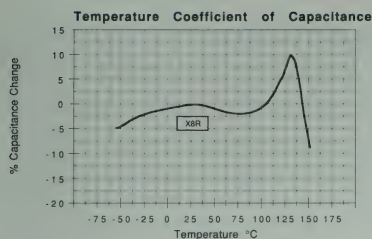
Type	L&W
0805	±.008 (±0.2)
1206	±.008 (±0.2)
1210	±.008 (±0.2)
1812	±.010 (±0.25)
2225	±.010 (±0.25)

PART NUMBERING SYSTEM

VJ0805	Style
H	Temperature Characteristic H = X8R
103	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. (See Cap. Code)
K	Capacitance Tolerance J = ± 5% K = ± 10% M = ± 20%
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish
A	VOLTAGE A = 50v
A	MARKING OPTION
T	PACKAGING OPTION Standard is Bulk T = 7" Reel R = 13" Reel B = Bulk W = Waffle (See pg. 26)

STYLE	VJ0805	VJ1206	VJ1210	VJ1812	VJ2225*
E.I.A. TYPE	0805	1206	1210	1812	2225
Length (L)	.079 (2.00)	.126 (3.20)	.126 (3.20)	.177 (4.50)	.220 (5.59)
Width (W)	.049 (1.25)	.063 (1.60)	.098 (2.50)	.126 (3.20)	.250 (6.35)
Thickness (T) Max	.051 (1.30)	.059 (1.50)	.067 (1.70)	.067 (1.70)	.070 (1.78)
Term. (P) Min	.010 (.25)	.010 (.25)	.010 (.25)	.010 (.25)	.010 (.25)
Max	.028 (.71)	.028 (.71)	.028 (.71)	.030 (.76)	.030 (.76)
Voltage (Vdc)	50	50	50	50	50
Cap. Code	Capacitance				
101	pF 100				
121	120				
151	150				
181	180				
221	220				
271	270				
331	330				
391	390				
471	470				
561	560				
681	680				
821	820				
102	1000				
122	1200				
152	1500				
182	1800				
222	2200				
272	2700				
332	3300				
392	3900				
472	4700				
562	5600				
682	6800				
822	8200				
103	μF .010				
123	.012				
153	.015				
183	.018				
223	.022				
273	.027				
333	.033				
393	.039				
473	.047				
563	.056				
683	.068				
823	.082				
104	.10				
124	.12				
154	.15				
184	.18				
224	.22				
274	.27				
334	.33				
394	.39				
474	.47				
564	.56				
684	.68				
824	.82				
105	1.0				

* IR and Vapor Phase soldering only recommended.



High Operating Temperature X8R Dielectric General Specifications

Capacitance Range: 470 pF to 1.0 μF.

Capacitance Tolerances: $\pm 5\%$, $\pm 10\%$ and $\pm 20\%$

Operating Temperature Range: -55°C to $+150^{\circ}\text{C}$.

Temperature Characteristic: $\pm 15\%$ with 0 Vdc applied

Voltage Ratings: 50 Vdc @ $+150^{\circ}\text{C}$.

Dissipation Factor: 2.5% (max.) @ 1.0 Vrms and 1 kHz

Insulation Resistance @ $+25^{\circ}\text{C}$ and rated Vdc:

100,000 megohms (min.) or 1000 ohm-farads (min.),
whichever is less.

Insulation Resistance @ $+150^{\circ}\text{C}$ and rated Vdc:

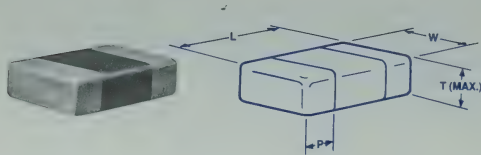
10,000 megohms (min.) or 100 ohm-farads (min.),
whichever is less.

Dielectric Withstanding Voltage: 250% of rated voltage
for 5 ± 1 seconds, 50 milliamps (max.).

Aging Rate: 1% (maximum) per decade

Unless otherwise specified all test data is at $+25^{\circ}\text{C}$

HIGH VOLTAGE AND SURGE SUPPRESSION CAPACITORS NPO DIELECTRIC



Dimensional Tolerances – Inch (mm)

Table with 4 columns: Type, L&W, Type, L&W. It lists dimensions for various capacitor types (0603, 0805, 1206, 1210, 1808, 1812, 1825, 2225) in inches and millimeters.

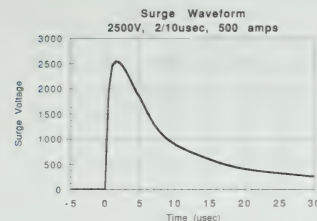
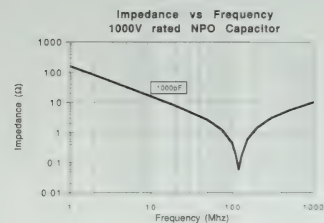
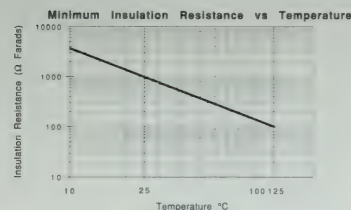
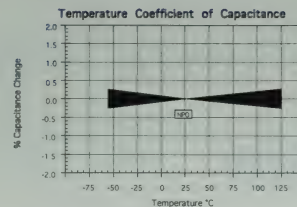
PART NUMBERING SYSTEM

Table detailing the part numbering system. It includes sections for Style (VJ0805), Temperature Characteristic (A = NPO), Capacitance (101), Capacitance Tolerance (K), Termination Material (X), Voltage (E), Marking Option (A), and Packaging Option (T).

Large table with columns: STYLE, VJ0603, VJ0805, VJ1206, VJ1210. It lists various capacitor styles and their dimensions (Length, Width, Thickness, Term. P, Voltage) in inches and millimeters.

STYLE		VJ1808			VJ1812			VJ1825*			VJ2225*		
E.I.A. TYPE					1812			1825					
Length (L)		.180 (4.57)			.177 (4.50)			.177 (4.50)			.220 (5.59)		
Width (W)		.080 (2.03)			.126 (3.20)			.252 (6.40)			.250 (6.35)		
Thickness (T) Max		.065 (1.65)			.067 (1.70)			.067 (1.70)			.070 (1.78)		
Term. (P)	Min	.010 (.25)			.010 (.25)			.010 (.25)			.010 (.25)		
	Max	.030 (.76)			.030 (.76)			.030 (.76)			.030 (.76)		
Voltage (Vdc)		200 500 1000			200 500 1000			200 500			200 500		
Cap. Code	Capacitance												
1R0	pF 1.0												
1R2	1.2												
1R5	1.5												
1R8	1.8												
2R2	2.2												
2R7	2.7												
3R3	3.3												
3R9	3.9												
4R7	4.7												
5R6	5.6												
6R8	6.8												
8R2	8.2												
100	10												
120	12												
150	15												
180	18												
220	22												
270	27												
330	33												
390	39												
470	47												
560	56												
680	68												
820	82												
101	100												
121	120												
151	150												
181	180												
221	220												
271	270												
331	330												
391	390												
471	470												
561	560												
681	680												
821	820												
102	1000												
122	1200												
152	1500												
182	1800												
222	2200												
272	2700												
332	3300												
392	3900												
472	4700												
562	5600												
682	6800												
822	8200												
103	μF .010												
123	.012												
153	.015												
183	.018												
223	.022												
273	.027												
333	.033												
393	.039												
473	.047												
563	.056												

* IR and Vapor Phase soldering only recommended.



High Voltage NPO Dielectric General Specifications

Capacitance Range: 1 pF to .039 μF

Capacitance Tolerances: $\pm 2\%$, $\pm 5\%$, $\pm 10\%$

Operating Temperature Range: -55°C to $+125^{\circ}\text{C}$.

Temperature Characteristic: 0 ± 30 ppm/ $^{\circ}\text{C}$.

Voltage Ratings: 200, 500, 1000 Vdc @ $+125^{\circ}\text{C}$.

Dissipation Factor: @ 1.0 Vrms and 25°C :
(0.1% max.) @ 1 MHZ for 1000 pF.
(0.1% max.) @ 1 KHZ for > 1000 pF.

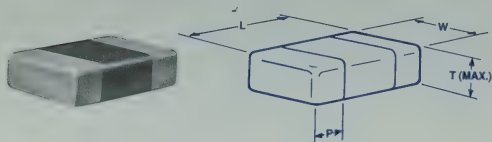
Insulation Resistance @ $+25^{\circ}\text{C}$ and rated Vdc:
100,000 megohms (min.) or 1000 ohm-farads (min.),
whichever is less.

Insulation Resistance @ $+125^{\circ}\text{C}$ and rated Vdc:
10,000 megohms (min.) or 100 ohm-farads (min.),
whichever is less.

Dielectric Withstanding Voltage: (200V) 250%
(500V) 200%, (1000V) 150% of rated voltage for
 5 ± 1 seconds, 50 milliseconds (max.).

Unless otherwise specified all test data is at $+25^{\circ}\text{C}$

HIGH VOLTAGE AND SURGE SUPPRESSION CAPACITORS X7R DIELECTRIC



Dimensional Tolerances – Inch (mm)

Type	L&W	Type	L&W
0603	±.005 (±0.12)	1812	±.010 (±0.25)
0805	±.008 (±0.2)	1825	±.010 (±0.25)
1206	±.008 (±0.2)	2225	±.010 (±0.25)
1210	±.008 (±0.2)	3640	±.015 (±0.38)
1808	±.010 (±0.25)		

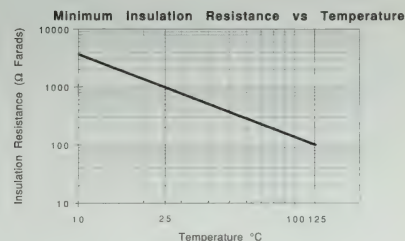
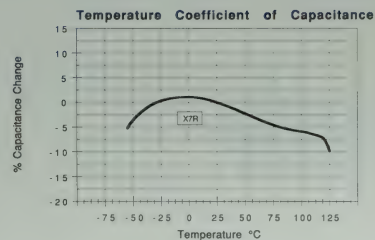
PART NUMBERING SYSTEM

VJ0805	Style
Y	Temperature Characteristic Y = X7R
103	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. (See Cap. Code)
K	Capacitance Tolerance J = ± 5% K = ± 10% M = ± 20%
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish
E	VOLTAGE C = 200v, E = 500v, G = 1000v
A	MARKING OPTION
T	PACKAGING OPTION Standard is Bulk T = 7" Reel R = 13" Reel B = Bulk W = Waffle (See pg. 26)

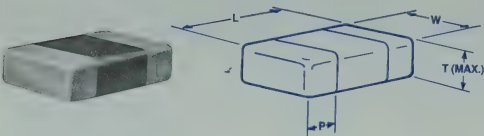
STYLE	VJ0603	VJ0805	VJ1206	VJ1210
E.I.A. TYPE	0603	0805	1206	1210
Length (L)	.063 (1.60)	.079 (2.00)	.126 (3.20)	.126 (3.20)
Width (W)	.031 (0.80)	.049 (1.25)	.063 (1.60)	.098 (2.50)
Thickness (T) Max	.035 (0.89)	.051 (1.30)	.059 (1.50)	.067 (1.70)
Term. (P)	Min Max	.005 (.12) .015 (.38)	.010 (.25) .028 (.71)	.010 (.25) .028 (.71)
Voltage (Vdc)	200	200	200 500	200 500
Cap. Code	Capacitance			
100	pF10			
120	12			
150	15			
180	18			
220	22			
270	27			
330	33			
390	39			
470	47			
560	56			
680	68			
820	82			
101	100			
121	120			
151	150			
181	180			
221	220			
271	270			
331	330			
391	390			
471	470			
561	560			
681	680			
821	820			
102	1000			
122	1200			
152	1500			
182	1800			
222	2200			
272	2700			
332	3300			
392	3900			
472	4700			
562	5600			
682	6800			
822	8200			
103	μF .010			
123	.012			
153	.015			
183	.018			
223	.022			
273	.027			
333	.033			
393	.039			
473	.047			
563	.056			
683	.068			
823	.082			
104	.10			
124	.12			
154	.15			
184	.18			
224	.22			
274	.27			
334	.33			
394	.39			
474	.47			
564	.56			
684	.68			
824	.82			
105	1.0			
125	1.2			

STYLE	VJ1808			VJ1812			VJ1825*			VJ2225*			VJ3640*		
E.I.A. TYPE				1812			1825								
Length (L)	.180 (4.57)			.177 (4.50)			.177 (4.50)			.220 (5.59)			.360 (9.14)		
Width (W)	.080 (2.03)			.126 (3.20)			.252 (6.40)			.250 (6.35)			.400 (10.20)		
Thickness (T) Max	.065 (1.65)			.067 (1.70)			.067 (1.70)			.070 (1.78)			.071 (1.80)		
Term. (P)	Min Max			.010 (.25) .030 (.76)			.010 (.25) .030 (.76)			.010 (.25) .030 (.76)			.030 (.76) .050 (1.27)		
Voltage (Vdc)	200 500 1000			200 500 1000			200 500			200 500			200 500		
Cap. Code	Capacitance														
100	pF10														
120	12														
150	15														
180	18														
220	22														
270	27														
330	33														
390	39														
470	47														
560	56														
680	68														
820	82														
101	100														
121	120														
151	150														
181	180														
221	220														
271	270														
331	330														
391	390														
471	470														
561	560														
681	680														
821	820														
102	1000														
122	1200														
152	1500														
182	1800														
222	2200														
272	2700														
332	3300														
392	3900														
472	4700														
562	5600														
682	6800														
822	8200														
103	μF .010														
123	.012														
153	.015														
183	.018														
223	.022														
273	.027														
333	.033														
393	.039														
473	.047														
563	.056														
683	.068														
823	.082														
104	.10														
124	.12														
154	.15														
184	.18														
224	.22														
274	.27														
334	.33														
394	.39														
474	.47														
564	.56														
684	.68														
824	.82														
105	1.0														
125	1.2														

* IR and Vapor Phase soldering only recommended.



HIGH Q DIELECTRIC



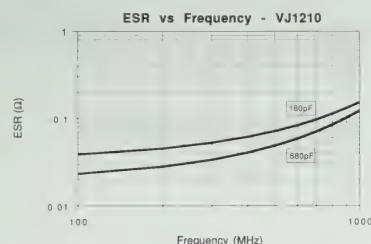
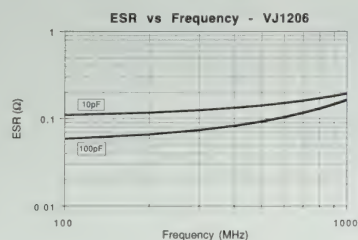
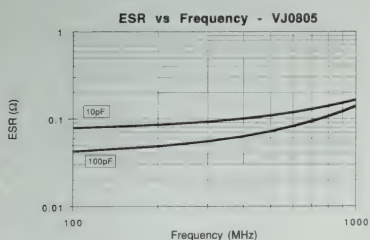
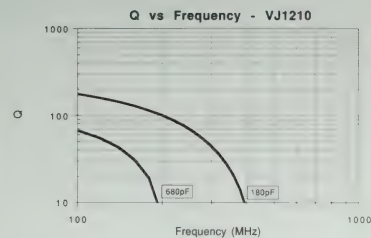
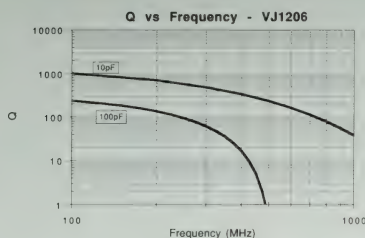
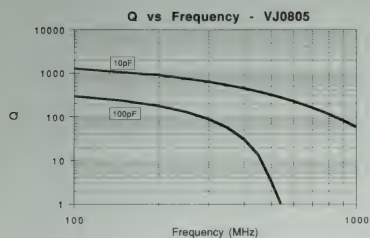
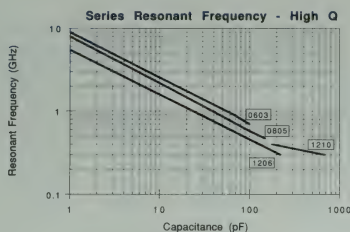
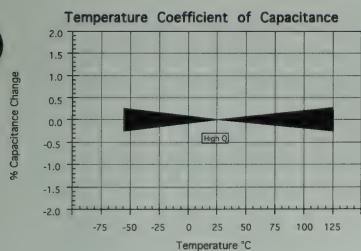
Dimensional Tolerances – Inch (mm)

Type	L&W
0603	±.005 (±0.12)
0805	±.008 (±0.2)
1206	±.008 (±0.2)
1210	±.008 (±0.2)

PART NUMBERING SYSTEM

VJ0603	Style
Q	Temperature Characteristic Q = Hi Q
101	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. An "R" denotes a decimal point in which case all figures are significant. (See Cap. Code)
K	Capacitance Tolerance C = ± .25pF G = ± 2% D = ± .5pF J = ± 5% F = ± 1% K = ± 10%
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish
A	VOLTAGE A = 50v B = 100v C = 200v
A	MARKING OPTION
T	PACKAGING OPTION Standard is Bulk

STYLE	VJ0603	VJ0805	VJ1206	VJ1210
E.I.A. TYPE	0603	0805	1206	1210
Length (L)	.063 (1.60)	.079 (2.00)	.126 (3.20)	.126 (3.20)
Width (W)	.031 (0.80)	.049 (1.25)	.063 (1.60)	.098 (2.50)
Thickness (T) Max	.035 (0.89)	.051 (1.30)	.059 (1.50)	.067 (1.70)
Term. (P) Min	.005 (.12)	.010 (.25)	.010 (.25)	.010 (.25)
Max	.015 (.38)	.028 (.71)	.028 (.71)	.028 (.71)
Voltage (Vdc)	50 100	50 100 200	50 100 200	50 100 200
Cap. Code	Capacitance			
1R0	pF 1.0			
1R2	1.2			
1R5	1.5			
1R8	1.8			
2R2	2.2			
2R7	2.7			
3R3	3.3			
3R9	3.9			
4R7	4.7			
5R6	5.6			
6R8	6.8			
8R2	8.2			
100	10			
120	12			
150	15			
180	18			
220	22			
270	27			
330	33			
390	39			
470	47			
560	56			
680	68			
820	82			
101	100			
121	120			
151	150			
181	180			
221	220			
271	270			
331	330			
391	390			
471	470			
561	560			
681	680			
821	820			



High Q Dielectric General Specifications

Capacitance Range: 1.0 pF to 680 pF

Operating Temperature Range: -55°C to +125°C.

Temperature Characteristic: NPO (COG) 0 ± 30 ppm/°C

Voltage Ratings: 200, 100 and 50 Vdc @ +125°C.

Dissipation Factor: 0.1% (max.) @ +25°C and 1.0 Vrms and 1MHz.

Insulation Resistance @ +25°C and rated Vdc:

100,000 megohms (min.) or 1000 ohm-farads (min.), whichever is less.

Insulation Resistance @ +125°C and rated Vdc:

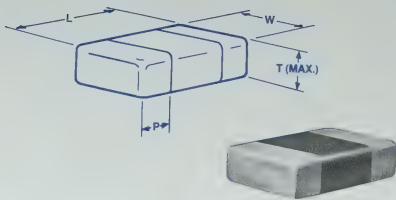
10,000 megohms (min.) or 100 ohm-farads (min.), whichever is less.

Dielectric Withstanding Voltage: 250% of rated voltage for 5 ± 1 seconds, 50 milliamps (max.).

Unless otherwise specified all test data is at +25°C

CDR MIL- C- 55681

STYLE	CDR01	CDR02	CDR03	CDR04	CDR06	CDR31	CDR32	CDR33	CDR34	CDR35
MIL-C-55681	/1	/1	/1	/1	/3	/7	/8	/9	/10	/11
Length (L)	.080 (2.03)	.180 (4.57)	.180 (4.57)	.180 (4.57)	.225 (5.72)	.078 (2.00)	.125 (3.20)	.125 (3.20)	.176 (4.50)	.176 (4.50)
Width (W)	.050 (1.27)	.050 (1.27)	.080 (2.03)	.125 (3.18)	.250 (6.35)	.049 (1.25)	.062 (1.60)	.098 (2.50)	.125 (3.20)	.250 (6.40)
Thickness (F) Max	.055 (1.40)	.055 (1.40)	.080 (2.03)	.080 (2.03)	.080 (2.03)	.051 (1.30)	.051 (1.30)	.059 (1.50)	.059 (1.50)	.059 (1.50)
Term. (P)	Min	.010 (.25)	.010 (.25)	.010 (.25)	.010 (.25)	.012 (.30)	.012 (.30)	.010 (.25)	.010 (.25)	.008 (.20)
	Max	.030 (.76)	.030 (.76)	.030 (.76)	.030 (.76)	.028 (.70)	.028 (.70)	.030 (.76)	.030 (.76)	.032 (.80)



Dimensional Tolerances – Inch (mm)

Style	L&W	Style	L&W
CDR01	±.015 (±0.38)	CDR31	±.008 (±.207)
CDR02	±.015 (±0.38)	CDR32	±.008 (±.207)
CDR03	±.015 (±0.38)	CDR33	±.010 (±0.25)
CDR04	±.015 (±0.38)	CDR34	±.010 (±0.25)
CDR06	±.020 (±0.51)	CDR35	±.012 (±0.30)

	Add to (L)	Add to (W) and (T)
CDR01	.020	.015
CDR02, 3, 4, 6	.025	.015
CDR31, 32	.020	.012
CDR33, 34, 35	.023	.012

NOTE: For solder coated terminations for various styles add the dimensions shown above to the table on the left.

CDR MIL-C-55681 General Specifications

Voltage Ratings: 100 Vdc and 50 Vdc
Insulation Resistance @ + 25°C and rated Vdc:
100,000 megohms or 1000 ohm-farads (min.), whichever is less.
Insulation Resistance @ + 125°C and rated Vdc:
10,000 megohms or 100 ohm-farads (min.), whichever is less.
Dissipation Factor: (max.) @ + 25°C: BX (2.5%); BP (0.15%)
Dielectric Withstanding Voltage: 250% rated Vdc for 5 ± 1 second
Capacitance Measuring Frequency: 10-100 pF (@ 1 MHz ± 50 Hz);
Over 100 pF (@ 1 kHz ± 50 Hz)
Signal Measuring Voltage: 1.0 ± 0.2 Vrms

Approximate Qty. per Reel

Body Size	Tape Size	7"	13"
CDR01	8 mm	3000	10000
CDR02	8 mm	3000	10000
CDR03	8 mm	3000	10000
CDR04	12 mm	1250	5000
CDR06	12 mm	1000	5000
CDR31	8 mm	3000	10000
CDR32	8 mm	3000	10000
CDR33	8 mm	3000	10000
CDR34	12 mm	1250	5000
CDR35	12 mm	1000	5000

CDR BP/BX DIELECTRIC – CDR01/02/03/04/06

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR01					
100	pF 10	CDRO1BP100B _ _ _	J,K	BP	100
120	12	CDRO1BP120BJ _ _ _	J	BP	100
150	15	CDRO1BP150B _ _ _	J,K	BP	100
180	18	CDRO1BP180BJ _ _ _	J	BP	100
220	22	CDRO1BP220B _ _ _	J,K	BP	100
270	27	CDRO1BP270BJ _ _ _	J	BP	100
330	33	CDRO1BP330B _ _ _	J,K	BP	100
390	39	CDRO1BP390BJ _ _ _	J	BP	100
470	47	CDRO1BP470B _ _ _	J,K	BP	100
560	56	CDRO1BP560BJ _ _ _	J	BP	100
680	68	CDRO1BP680B _ _ _	J,K	BP	100
820	82	CDRO1BP820BJ _ _ _	J	BP	100
101	100	CDRO1BP101B _ _ _	J,K	BP	100
121	120	CDRO1B-121B _ _ _	J,K	BP,BX	100
151	150	CDRO1B-151B _ _ _	J,K	BP,BX	100
181	180	CDRO1B-181B _ _ _	J,K	BP,BX	100
221	220	CDRO1BX221B _ _ _	K,M	BX	100
271	270	CDRO1BX271BK _ _ _	K	BX	100
331	330	CDRO1BX331B _ _ _	K,M	BX	100
391	390	CDRO1BX391BK _ _ _	K	BX	100
471	470	CDRO1BX471B _ _ _	K,M	BX	100
561	560	CDRO1BX561BK _ _ _	K	BX	100
681	680	CDRO1BX681B _ _ _	K,M	BX	100
821	820	CDRO1BX821BK _ _ _	K	BX	100
102	1000	CDRO1BX102B _ _ _	K,M	BX	100
122	1200	CDRO1BX122BK _ _ _	K	BX	100
152	1500	CDRO1BX152B _ _ _	K,M	BX	100
182	1800	CDRO1BX182BK _ _ _	K	BX	100
222	2200	CDRO1BX222B _ _ _	K,M	BX	100
272	2700	CDRO1BX272BK _ _ _	K	BX	100
332	3300	CDRO1BX332B _ _ _	K,M	BX	100
392	3900	CDRO1BX392AK _ _ _	K	BX	50
472	4700	CDRO1BX472A _ _ _	K,M	BX	50
CDR02					
221	220	CDRO2BP221B _ _ _	J,K	BP	100
271	270	CDRO2BP271BJ _ _ _	J	BP	100
392	3900	CDRO2BX392BK _ _ _	K	BX	100
472	4700	CDRO2BX472B _ _ _	K,M	BX	100
562	5600	CDRO2BX562BK _ _ _	K	BX	100
682	6800	CDRO2BX682B _ _ _	K,M	BX	100
822	8200	CDRO2BX822BK _ _ _	K	BX	100
103	10,000	CDRO2BX103B _ _ _	K,M	BX	100
123	12,000	CDRO2BX123AK _ _ _	K	BX	50
153	15,000	CDRO2BX153A _ _ _	K,M	BX	50
183	18,000	CDRO2BX183AK _ _ _	K	BX	50
223	22,000	CDRO2BX223A _ _ _	K,M	BX	50

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR03					
331	330	CDRO3BP331B _ _ _	J,K	BP	100
391	390	CDRO3BP391BJ _ _ _	J	BP	100
471	470	CDRO3BP471B _ _ _	J,K	BP	100
561	560	CDRO3BP561BJ _ _ _	J	BP	100
681	680	CDRO3BP681B _ _ _	J,K	BP	100
821	820	CDRO3BP821BJ _ _ _	J	BP	100
102	1,000	CDRO3BP102B _ _ _	J,K	BP	100
123	12,000	CDRO3BX123BK _ _ _	K	BX	100
153	15,000	CDRO3BX153B _ _ _	K,M	BX	100
183	18,000	CDRO3BX183BK _ _ _	K	BX	100
223	22,000	CDRO3BX223B _ _ _	K,M	BX	100
273	27,000	CDRO3BX273BK _ _ _	K	BX	100
333	33,000	CDRO3BX333B _ _ _	K,M	BX	100
393	39,000	CDRO3BX393AK _ _ _	K	BX	50
473	47,000	CDRO3BX473A _ _ _	K,M	BX	50
563	56,000	CDRO3BX563AK _ _ _	K	BX	50
683	68,000	CDRO3BX683A _ _ _	K,M	BX	50
CDR04					
122	1,200	CDRO4BP122BJ _ _ _	J	BP	100
152	1,500	CDRO4BP152B _ _ _	J,K	BP	100
182	1,800	CDRO4BP182BJ _ _ _	J	BP	100
222	2,200	CDRO4BP222B _ _ _	J,K	BP	100
272	2,700	CDRO4BP272BJ _ _ _	J	BP	100
332	3,300	CDRO4BP332B _ _ _	J,K	BP	100
393	39,000	CDRO4BX393BK _ _ _	K	BX	100
473	47,000	CDRO4BX473B _ _ _	K,M	BX	100
563	56,000	CDRO4BX563BK _ _ _	K	BX	100
823	82,000	CDRO4BX823AK _ _ _	K	BX	50
104	100,000	CDRO4BX104A _ _ _	K,M	BX	50
124	120,000	CDRO4BX124AK _ _ _	K	BX	50
154	150,000	CDRO4BX154A _ _ _	K,M	BX	50
184	180,000	CDRO4BX184AK _ _ _	K	BX	50
CDR06					
394	390,000	CDRO6BX394AK _ _ _	K	BX	50
474	470,000	CDRO6BX474A _ _ _	K,M	BX	50

M

Failure Rate Level (per 1000 hours)

M = 1.0% P = 0.1% R = .01% S = .001%

*Contact factory for failure rate status.

Y

Termination Finishes

with barrier base metallization:

Y = Tin plated (100% Tin)

W = Solder plated (Tin/Lead alloy)

U = Solder coated

with no barrier base metallization:

M = Palladium-Silver

S = Solder coated

K

Capacitance Tolerance

Per MIL-C-55681 J = 5% K = 10% M = 20%

CDR BP/BX DIELECTRIC – CDR31

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR31 BP					
1R0	pF 1.0	CDR31BP1R0B	B,C	BP	100
1R1	1.1	CDR31BP1R1B	B,C	BP	100
1R2	1.2	CDR31BP1R2B	B,C	BP	100
1R3	1.3	CDR31BP1R3B	B,C	BP	100
1R5	1.5	CDR31BP1R5B	B,C	BP	100
1R6	1.6	CDR31BP1R6B	B,C	BP	100
1R8	1.8	CDR31BP1R8B	B,C	BP	100
2R0	2.0	CDR31BP2R0B	B,C	BP	100
2R2	2.2	CDR31BP2R2B	B,C	BP	100
2R4	2.4	CDR31BP2R4B	B,C	BP	100
2R7	2.7	CDR31BP2R7B	B,C,D	BP	100
3R0	3.0	CDR31BP3R0B	B,C,D	BP	100
3R3	3.3	CDR31BP3R3B	B,C,D	BP	100
3R6	3.6	CDR31BP3R6B	B,C,D	BP	100
3R9	3.9	CDR31BP3R9B	B,C,D	BP	100
4R3	4.3	CDR31BP4R3B	B,C,D	BP	100
4R7	4.7	CDR31BP4R7B	B,C,D	BP	100
5R1	5.1	CDR31BP5R1B	B,C,D	BP	100
5R6	5.6	CDR31BP5R6B	B,C,D	BP	100
6R2	6.2	CDR31BP6R2B	B,C,D	BP	100
6R8	6.8	CDR31BP6R8B	B,C,D	BP	100
7R5	7.5	CDR31BP7R5B	B,C,D	BP	100
8R2	8.2	CDR31BP8R2B	B,C,D	BP	100
9R1	9.1	CDR31BP9R1B	B,C,D	BP	100
100	10	CDR31BP100B	F,J,K	BP	100
110	11	CDR31BP110B	F,J,K	BP	100
120	12	CDR31BP120B	F,J,K	BP	100
130	13	CDR31BP130B	F,J,K	BP	100
150	15	CDR31BP150B	F,J,K	BP	100
160	16	CDR31BP160B	F,J,K	BP	100
180	18	CDR31BP180B	F,J,K	BP	100
200	20	CDR31BP200B	F,J,K	BP	100
220	22	CDR31BP220B	F,J,K	BP	100
240	24	CDR31BP240B	F,J,K	BP	100
270	27	CDR31BP270B	F,J,K	BP	100
300	30	CDR31BP300B	F,J,K	BP	100
330	33	CDR31BP330B	F,J,K	BP	100
360	36	CDR31BP360B	F,J,K	BP	100
390	39	CDR31BP390B	F,J,K	BP	100
430	43	CDR31BP430B	F,J,K	BP	100
470	47	CDR31BP470B	F,J,K	BP	100
510	51	CDR31BP510B	F,J,K	BP	100
560	56	CDR31BP560B	F,J,K	BP	100
620	62	CDR31BP620B	F,J,K	BP	100
680	68	CDR31BP680B	F,J,K	BP	100
750	75	CDR31BP750B	F,J,K	BP	100
820	82	CDR31BP820B	F,J,K	BP	100
910	91	CDR31BP910B	F,J,K	BP	100

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR31 BP Cont.					
101	pF 100	CDR31BP101B	F,J,K	BP	100
111	110	CDR31BP111B	F,J,K	BP	100
121	120	CDR31BP121B	F,J,K	BP	100
131	130	CDR31BP131B	F,J,K	BP	100
151	150	CDR31BP151B	F,J,K	BP	100
161	160	CDR31BP161B	F,J,K	BP	100
181	180	CDR31BP181B	F,J,K	BP	100
201	200	CDR31BP201B	F,J,K	BP	100
221	220	CDR31BP221B	F,J,K	BP	100
241	240	CDR31BP241B	F,J,K	BP	100
271	270	CDR31BP271B	F,J,K	BP	100
301	300	CDR31BP301B	F,J,K	BP	100
331	330	CDR31BP331B	F,J,K	BP	100
361	360	CDR31BP361B	F,J,K	BP	100
391	390	CDR31BP391B	F,J,K	BP	100
431	430	CDR31BP431B	F,J,K	BP	100
471	470	CDR31BP471B	F,J,K	BP	100
511	510	CDR31BP511A	F,J,K	BP	50
561	560	CDR31BP561A	F,J,K	BP	50
621	620	CDR31BP621A	F,J,K	BP	50
681	680	CDR31BP681A	F,J,K	BP	50
CDR31 BX					
471	470	CDR31BX471B	K,M	BX	100
561	560	CDR31BX561B	K,M	BX	100
681	680	CDR31BX681B	K,M	BX	100
821	820	CDR31BX821B	K,M	BX	100
102	1,000	CDR31BX102B	K,M	BX	100
122	1,200	CDR31BX122B	K,M	BX	100
152	1,500	CDR31BX152B	K,M	BX	100
182	1,800	CDR31BX182B	K,M	BX	100
222	2,200	CDR31BX222B	K,M	BX	100
272	2,700	CDR31BX272B	K,M	BX	100
332	3,300	CDR31BX332B	K,M	BX	100
392	3,900	CDR31BX392B	K,M	BX	100
472	4,700	CDR31BX472B	K,M	BX	100
562	5,600	CDR31BX562A	K,M	BX	50
682	6,800	CDR31BX682A	K,M	BX	50
822	8,200	CDR31BX822A	K,M	BX	50
103	10,000	CDR31BX103A	K,M	BX	50
123	12,000	CDR31BX123A	K,M	BX	50
153	15,000	CDR31BX153A	K,M	BX	50
183	18,000	CDR31BX183A	K,M	BX	50

M*

Failure Rate Level (per 1000 hours)

M = 1.0% P = 0.1% R = .01% S = .001%

*Contact factory for failure rate status.

Y

Termination Finishes

with barrier base metallization:

Y = Tin plated (100% Tin)

W = Solder plated (Tin/Lead alloy)

U = Solder coated

with no barrier base metallization:

M = Palladium-Silver

S = Solder coated

K

Capacitance Tolerance

Per MIL-C-55681 B = ± 10 pF C = ± 25 pF D = ± 50 pF

F = $\pm 1\%$ J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$

CDR BP/BX DIELECTRIC – CDR32

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR32 BP					
1R0	pF 1.0	CDR32BP1R0B	B,C	BP	100
1R1	1.1	CDR32BP1R1B	B,C	BP	100
1R2	1.2	CDR32BP1R2B	B,C	BP	100
1R3	1.3	CDR32BP1R3B	B,C	BP	100
1R5	1.5	CDR32BP1R5B	B,C	BP	100
1R6	1.6	CDR32BP1R6B	B,C	BP	100
1R8	1.8	CDR32BP1R8B	B,C	BP	100
2R0	2.0	CDR32BP2R0B	B,C	BP	100
2R2	2.2	CDR32BP2R2B	B,C	BP	100
2R4	2.4	CDR32BP2R4B	B,C	BP	100
2R7	2.7	CDR32BP2R7B	B,C,D	BP	100
3R0	3.0	CDR32BP3R0B	B,C,D	BP	100
3R3	3.3	CDR32BP3R3B	B,C,D	BP	100
3R6	3.6	CDR32BP3R6B	B,C,D	BP	100
3R9	3.9	CDR32BP3R9B	B,C,D	BP	100
4R3	4.3	CDR32BP4R3B	B,C,D	BP	100
4R7	4.7	CDR32BP4R7B	B,C,D	BP	100
5R1	5.1	CDR32BP5R1B	B,C,D	BP	100
5R6	5.6	CDR32BP5R6B	B,C,D	BP	100
6R2	6.2	CDR32BP6R2B	B,C,D	BP	100
6R8	6.8	CDR32BP6R8B	B,C,D	BP	100
7R5	7.5	CDR32BP7R5B	B,C,D	BP	100
8R2	8.2	CDR32BP8R2B	B,C,D	BP	100
9R1	9.1	CDR32BP9R1B	B,C,D	BP	100
100	10	CDR32BP100B	F,J,K	BP	100
110	11	CDR32BP110B	F,J,K	BP	100
120	12	CDR32BP120B	F,J,K	BP	100
130	13	CDR32BP130B	F,J,K	BP	100
150	15	CDR32BP150B	F,J,K	BP	100
160	16	CDR32BP160B	F,J,K	BP	100
180	18	CDR32BP180B	F,J,K	BP	100
200	20	CDR32BP200B	F,J,K	BP	100
220	22	CDR32BP220B	F,J,K	BP	100
240	24	CDR32BP240B	F,J,K	BP	100
270	27	CDR32BP270B	F,J,K	BP	100
300	30	CDR32BP300B	F,J,K	BP	100
330	33	CDR32BP330B	F,J,K	BP	100
360	36	CDR32BP360B	F,J,K	BP	100
390	39	CDR32BP390B	F,J,K	BP	100
430	43	CDR32BP430B	F,J,K	BP	100
470	47	CDR32BP470B	F,J,K	BP	100
510	51	CDR32BP510B	F,J,K	BP	100
560	56	CDR32BP560B	F,J,K	BP	100
620	62	CDR32BP620B	F,J,K	BP	100
680	68	CDR32BP680B	F,J,K	BP	100
750	75	CDR32BP750B	F,J,K	BP	100
820	82	CDR32BP820B	F,J,K	BP	100
910	91	CDR32BP910B	F,J,K	BP	100

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR32 BP Cont.					
101	pF 100	CDR32BP101B	F,J,K	BP	100
111	110	CDR32BP111B	F,J,K	BP	100
121	120	CDR32BP121B	F,J,K	BP	100
131	130	CDR32BP131B	F,J,K	BP	100
151	150	CDR32BP151B	F,J,K	BP	100
161	160	CDR32BP161B	F,J,K	BP	100
181	180	CDR32BP181B	F,J,K	BP	100
201	200	CDR32BP201B	F,J,K	BP	100
221	220	CDR32BP221B	F,J,K	BP	100
241	240	CDR32BP241B	F,J,K	BP	100
271	270	CDR32BP271B	F,J,K	BP	100
301	300	CDR32BP301B	F,J,K	BP	100
331	330	CDR32BP331B	F,J,K	BP	100
361	360	CDR32BP361B	F,J,K	BP	100
391	390	CDR32BP391B	F,J,K	BP	100
431	430	CDR32BP431B	F,J,K	BP	100
471	470	CDR32BP471B	F,J,K	BP	100
511	510	CDR32BP511B	F,J,K	BP	100
561	560	CDR32BP561B	F,J,K	BP	100
621	620	CDR32BP621B	F,J,K	BP	100
681	680	CDR32BP681A	F,J,K	BP	100
751	750	CDR32BP751B	F,J,K	BP	100
821	820	CDR32BP821B	F,J,K	BP	100
911	910	CDR32BP911B	F,J,K	BP	100
102	1,000	CDR32BP102B	F,J,K	BP	100
112	1,100	CDR32BP112A	F,J,K	BP	50
122	1,200	CDR32BP122A	F,J,K	BP	50
132	1,300	CDR32BP132A	F,J,K	BP	50
152	1,500	CDR32BP152A	F,J,K	BP	50
162	1,600	CDR32BP162A	F,J,K	BP	50
182	1,800	CDR32BP182A	F,J,K	BP	50
202	2,000	CDR32BP202A	F,J,K	BP	50
222	2,200	CDR32BP222A	F,J,K	BP	50
CDR32 BX					
472	4,700	CDR32BX472B	K,M	BX	100
562	5,600	CDR32BX562B	K,M	BX	100
682	6,800	CDR32BX682B	K,M	BX	100
822	8,200	CDR32BX822B	K,M	BX	100
103	10,000	CDR32BX103B	K,M	BX	100
123	12,000	CDR32BX123B	K,M	BX	100
153	15,000	CDR32BX153B	K,M	BX	100
183	18,000	CDR32BX183A	K,M	BX	50
223	22,000	CDR32BX223A	K,M	BX	50
273	27,000	CDR32BX273A	K,M	BX	50
333	33,000	CDR32BX333A	K,M	BX	50
393	39,000	CDR32BX393A	K,M	BX	50

M*

Failure Rate Level (per 1000 hours)

M = 1.0% P = 0.1% R = .01% S = .001%

*Contact factory for failure rate status.

Y

Termination Finishes

with barrier base metallization:

Y = Tin plated (100% Tin)

W = Solder plated (Tin/Lead alloy)

U = Solder coated

with no barrier base metallization:

M = Palladium-Silver

S = Solder coated

K

Capacitance Tolerance

Per MIL-C-55681 B = ± 10 pF C = ± 25 pF D = ± 50 pFF = $\pm 1\%$ J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$

CDR BP/BX DIELECTRIC – CDR33/34/35

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR33 BP					
102	pF 1,000	CDR33BP102B ___	F,J,K	BP	100
112	1,100	CDR33BP112B ___	F,J,K	BP	100
122	1,200	CDR33BP122B ___	F,J,K	BP	100
132	1,300	CDR33BP132B ___	F,J,K	BP	100
152	1,500	CDR33BP152B ___	F,J,K	BP	100
162	1,600	CDR33BP162B ___	F,J,K	BP	100
182	1,800	CDR33BP182B ___	F,J,K	BP	100
202	2,000	CDR33BP202B ___	F,J,K	BP	100
222	2,200	CDR33BP222B ___	F,J,K	BP	100
242	2,400	CDR33BP242A ___	F,J,K	BP	50
272	2,700	CDR33BP272A ___	F,J,K	BP	50
302	3,000	CDR33BP302A ___	F,J,K	BP	50
332	3,300	CDR33BP332A ___	F,J,K	BP	50
CDR33 BX					
153	15,000	CDR33BX153B ___	K,M	BX	100
183	18,000	CDR33BX183B ___	K,M	BX	100
223	22,000	CDR33BX223B ___	K,M	BX	100
273	27,000	CDR33BX273B ___	K,M	BX	100
393	39,000	CDR33BX393A ___	K,M	BX	50
473	47,000	CDR33BX473A ___	K,M	BX	50
563	56,000	CDR33BX563A ___	K,M	BX	50
683	68,000	CDR33BX683A ___	K,M	BX	50
823	82,000	CDR33BX823A ___	K,M	BX	50
104	100,000	CDR33BX104A ___	K,M	BX	50
CDR34 BP					
222	2,200	CDR34BP222B ___	F,J,K	BP	100
242	2,400	CDR34BP242B ___	F,J,K	BP	100
272	2,700	CDR34BP272B ___	F,J,K	BP	100
302	3,000	CDR34BP302B ___	F,J,K	BP	100
332	3,300	CDR34BP332B ___	F,J,K	BP	100
362	3,600	CDR34BP362B ___	F,J,K	BP	100
392	3,900	CDR34BP392B ___	F,J,K	BP	100
432	4,300	CDR34BP432B ___	F,J,K	BP	100
472	4,700	CDR34BP472B ___	F,J,K	BP	100
512	5,100	CDR34BP512A ___	F,J,K	BP	50
562	5,600	CDR34BP562A ___	F,J,K	BP	50
622	6,200	CDR34BP622A ___	F,J,K	BP	50
682	6,800	CDR34BP682A ___	F,J,K	BP	50
752	7,500	CDR34BP752A ___	F,J,K	BP	50
822	8,200	CDR34BP822A ___	F,J,K	BP	50
912	9,100	CDR34BP912A ___	F,J,K	BP	50
103	10,000	CDR34BP103A ___	F,J,K	BP	50

Cap. Code	Capacitance	Military Type Designation	Capacitance Tolerance	Rated Temp. and Voltage Temp. Limits	Voltage (DC)
CDR34 BX					
273	pF 27,000	CDR34BX273B ___	K,M	BX	100
333	33,000	CDR34BX333B ___	K,M	BX	100
393	39,000	CDR34BX393B ___	K,M	BX	100
473	47,000	CDR34BX473B ___	K,M	BX	100
563	56,000	CDR34BX563B ___	K,M	BX	100
104	100,000	CDR34BX104A ___	K,M	BX	50
124	120,000	CDR34BX124A ___	K,M	BX	50
154	150,000	CDR34BX154A ___	K,M	BX	50
184	180,000	CDR34BX184A ___	K,M	BX	50
CDR35 BP					
472	4,700	CDR35BP472B ___	F,J,K	BP	100
512	5,100	CDR35BP512B ___	F,J,K	BP	100
562	5,600	CDR35BP562B ___	F,J,K	BP	100
622	6,200	CDR35BP622B ___	F,J,K	BP	100
682	6,800	CDR35BP682B ___	F,J,K	BP	100
752	7,500	CDR35BP752B ___	F,J,K	BP	100
822	8,200	CDR35BP822B ___	F,J,K	BP	100
912	9,100	CDR35BP912B ___	F,J,K	BP	100
103	10,000	CDR35BP103B ___	F,J,K	BP	100
113	11,000	CDR35BP113A ___	F,J,K	BP	50
123	12,000	CDR35BP123A ___	F,J,K	BP	50
133	13,000	CDR35BP133A ___	F,J,K	BP	50
153	15,000	CDR35BP153A ___	F,J,K	BP	50
163	16,000	CDR35BP163A ___	F,J,K	BP	50
183	18,000	CDR35BP183A ___	F,J,K	BP	50
203	20,000	CDR35BP203A ___	F,J,K	BP	50
223	22,000	CDR35BP223A ___	F,J,K	BP	50
CDR35 BX					
563	56,000	CDR35BX563B ___	K,M	BX	100
683	68,000	CDR35BX683B ___	K,M	BX	100
823	82,000	CDR35BX823B ___	K,M	BX	100
104	100,000	CDR35BX104B ___	K,M	BX	100
124	120,000	CDR35BX124B ___	K,M	BX	100
154	150,000	CDR35BX154B ___	K,M	BX	100
184	180,000	CDR35BX184A ___	K,M	BX	50
224	220,000	CDR35BX224A ___	K,M	BX	50
274	270,000	CDR35BX274A ___	K,M	BX	50
334	330,000	CDR35BX334A ___	K,M	BX	50
394	390,000	CDR35BX394A ___	K,M	BX	50
474	470,000	CDR35BX474A ___	K,M	BX	50

M*

Failure Rate Level (per 1000 hours)
M = 1.0% P = 0.1% R = .01% S = .001%
*Contact factory for failure rate status.

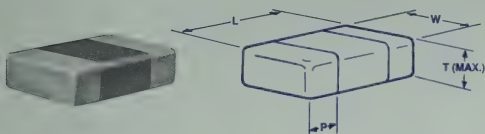
Y

Termination Finishes
with barrier base metallization:
Y = Tin plated (100% Tin)
W = Solder plated (Tin/Lead alloy)
U = Solder coated
with no barrier base metallization:
M = Palladium-Silver
S = Solder coated

K

Capacitance Tolerance
Per MIL-C-55681 F = ± 1% J = ± 5% K = ± 10% M = ± 20%

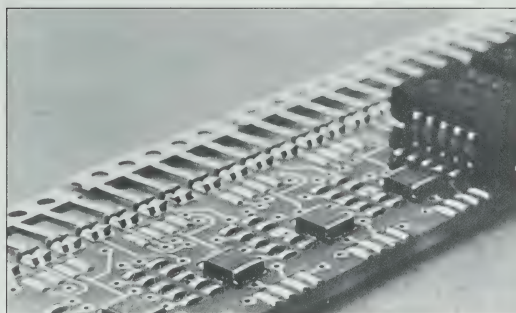
LOW PROFILE DECOUPLING CAPACITORS



STYLE	VJ7074		VJ7014		VJ7965		VJ7018	
EIA. TYPE	0805		1206		1210		1210	
Length (L)	.079 (2.00)		.126 (3.20)		.126 (3.20)		.126 (3.20)	
Width (W)	.049 (1.25)		.063 (1.60)		.098 (2.50)		.098 (2.50)	
Max Thickness (T)	.027 (0.68)		.025 (0.63)		.026 (0.66)		.023 (0.58)	
Term. (P)	.005 (.127)		.020 (.508)		.020 (.508)		.020 (.508)	
Voltage (Vdc)	25 50		25 50		25 50		25 50	
Cap. Code	Capacitance							
473	μF .047							
104	.10							
124	.12							
154	.15							
184	.18							
224	.22							
274	.27							
334	.33							

PART NUMBERING SYSTEM

VJ7014	Style
U	Temperature Characteristic U = Z5U
104	Capacitance Expressed in picofarads (pF). First two digits are significant figures. Last digit specifies number zeros to follow. (See Cap. Code)
P	Capacitance Tolerance M ($\pm 20\%$) and Z ($+ 80\% - 20\%$) are standard. P ($+ 100\% - 0\%$)
X	Termination Material Standard: X = Nickel Barrier, Tin Plated finish F = Palladium-Silver Others: N = Silver, Nickel Barrier, Sn62 Solder coated finish H = Palladium-Silver, Sn62 Solder coated finish
X	VOLTAGE X = 25v, A = 50v
A	MARKING OPTION Standard: A = No Marking
T	PACKAGING OPTION Standard is Bulk T = 7" Reel R = 13" Reel (See Page 26) B = Bulk W = Waffle



Low Profile Decoupling Capacitors General Specifications

Capacitance Range: .047 to .33 μ F.

Capacitance Tolerances: $\pm 20\%$, $+80\%/-20\%$, $+100\%/-0\%$

Operating Temperature Range: $+10^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

Temperature Characteristics: $+22\%$, -56%

Voltage Ratings: 25, 50 Vdc @ $+ 85^{\circ}\text{C}$.

Dissipation Factor:

50v ratings, 3.0% (max.) @ .5 Vrms and 1 kHz

25v ratings, 3.5% (max.) @ .5 Vrms and 1 kHz

Insulation Resistance @ $+25^{\circ}\text{C}$ and rated Vdc:

1000 ohm-farads (min.)

Dielectric Withstanding Voltage: 250% rated Vdc for 5 ± 1.0 seconds with 50 milliamps (max.)

CHIP KITS

Chip Kits

AVAILABLE THROUGH VITRAMON DISTRIBUTORS

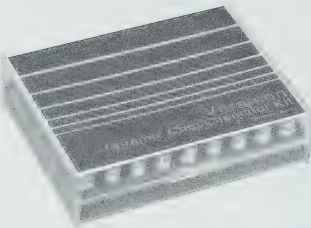
These Ceramic Chip Capacitor Kits provide a wide range of capacitance, dielectric types and tolerances to choose from. Each kit contains 6200 pieces, all of which contain our tin plated nickel barrier terminations.

0805 KIT

VIAL NO.	PART NO.	VIAL NO.	PART NO.	VIAL NO.	PART NO.
1	VJ0805A1RODXAAB	22	VJ0805A121JXAAB	43	VJ0805Y152KXAAB
2	VJ0805A2R2DXAAB	23	VJ0805A131JXAAB	44	VJ0805Y222KXAAB
3	VJ0805A2R7DXAAB	24	VJ0805A151JXAAB	45	VJ0805Y272KXAAB
4	VJ0805A3R3DXAAB	25	VJ0805A161JXAAB	46	VJ0805Y332KXAAB
5	VJ0805A3R9DXAAB	26	VJ0805A181JXAAB	47	VJ0805Y472KXAAB
6	VJ0805A4R7DXAAB	27	VJ0805A201JXAAB	48	VJ0805Y562KXAAB
7	VJ0805A6R8DXAAB	28	VJ0805A221JXAAB	49	VJ0805Y682KXAAB
8	VJ0805A8R2DXAAB	29	VJ0805A241JXAAB	50	VJ0805Y103KXAAB
9	VJ0805A100JXAAB	30	VJ0805A271JXAAB	51	VJ0805Y153KXAAB
10	VJ0805A120JXAAB	31	VJ0805A301JXAAB	52	VJ0805Y223KXAAB
11	VJ0805A150JXAAB	32	VJ0805A331JXAAB	53	VJ0805Y273KXAAB
12	VJ0805A180JXAAB	33	VJ0805A361JXAAB	54	VJ0805Y333KXAAB
13	VJ0805A220JXAAB	34	VJ0805A391JXAAB	55	VJ0805Y473KXAAB
14	VJ0805A270JXAAB	35	VJ0805A431JXAAB	56	VJ0805U103MXAAB
15	VJ0805A330JXAAB	36	VJ0805A471JXAAB	57	VJ0805U153MXAAB
16	VJ0805A390JXAAB	37	VJ0805A561JXAAB	58	VJ0805U223MXAAB
17	VJ0805A470JXAAB	38	VJ0805A621JXAAB	59	VJ0805U333MXAAB
18	VJ0805A680JXAAB	39	VJ0805A681JXAAB	60	VJ0805U473MXAAB
19	VJ0805A820JXAAB	40	VJ0805A821JXAAB	61	VJ0805U683MXAAB
20	VJ0805A101JXAAB	41	VJ0805A102JXAAB	62	VJ0805U104MXAAB
21	VJ0805A111JXAAB	42	VJ0805Y102KXAAB		

1206 KIT

VIAL NO.	PART NO.	VIAL NO.	PART NO.	VIAL NO.	PART NO.
1	VJ1206A1RODXAAB	22	VJ1206A131JXAAB	43	VJ1206Y222KXAAB
2	VJ1206A2R2DXAAB	23	VJ1206A151JXAAB	44	VJ1206Y272KXAAB
3	VJ1206A2R7DXAAB	24	VJ1206A181JXAAB	45	VJ1206Y472KXAAB
4	VJ1206A3R3DXAAB	25	VJ1206A221JXAAB	46	VJ1206Y682KXAAB
5	VJ1206A3R9DXAAB	26	VJ1206A271JXAAB	47	VJ1206Y103KXAAB
6	VJ1206A4R7DXAAB	27	VJ1206A301JXAAB	48	VJ1206Y153KXAAB
7	VJ1206A6R8DXAAB	28	VJ1206A331JXAAB	49	VJ1206Y273KXAAB
8	VJ1206A8R2DXAAB	29	VJ1206A361JXAAB	50	VJ1206Y333KXAAB
9	VJ1206A100JXAAB	30	VJ1206A391JXAAB	51	VJ1206Y473KXAAB
10	VJ1206A120JXAAB	31	VJ1206A471JXAAB	52	VJ1206Y683KXAAB
11	VJ1206A150JXAAB	32	VJ1206A511JXAAB	53	VJ1206Y104KXAAB
12	VJ1206A180JXAAB	33	VJ1206A561JXAAB	54	VJ1206U103ZXAAB
13	VJ1206A220JXAAB	34	VJ1206A681JXAAB	55	VJ1206U153ZXAAB
14	VJ1206A270JXAAB	35	VJ1206A102JXAAB	56	VJ1206U223ZXAAB
15	VJ1206A330JXAAB	36	VJ1206Y122JXAAB	57	VJ1206U333ZXAAB
16	VJ1206A390JXAAB	37	VJ1206Y152JXAAB	58	VJ1206U473ZXAAB
17	VJ1206A470JXAAB	38	VJ1206Y182JXAAB	59	VJ1206U683ZXAAB
18	VJ1206A680JXAAB	39	VJ1206Y222JXAAB	60	VJ1206U104ZXAAB
19	VJ1206A820JXAAB	40	VJ1206Y272JXAAB	61	VJ1206U154ZXAAB
20	VJ1206A101JXAAB	41	VJ1206Y102KXAAB	62	VJ1206U224ZXAAB
21	VJ1206A111JXAAB	42	VJ1206Y152KXAAB		



Each kit has a selection of 62 nominal values (100 pieces each) in three dielectric types NPO (COG), X7R and Z5U.

All parts have our tin plated nickel barrier terminations.

Each kit contains a non-metallic tweezer.

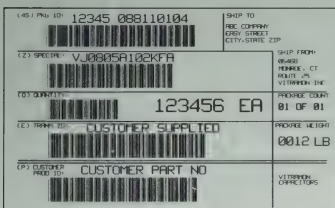
To order specify #0805 kit or #1206 kit.

BAR CODE LABEL OPTIONS

Bar code labeling is provided by customer request.

Outer Shipping Container – Option 1

Format: E.I.A.*-556
 Symbology: Code 39
 Density: 5.0 CPI
 Label Size: 4.0 inch x 6.5 inch (102mm x 165mm)

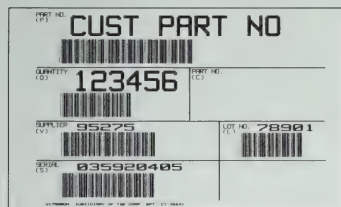


Description	E.I.A.* ID	Max Char	Char Type	Bar Coated
Supplied Package ID	4S	14	AN	Yes
Special-(Vendor PN)	Z	18	AN	Yes
Quantity-in Package	Q	6	N	Yes
Transaction No.	E	18	AN	Yes
Customer Product ID	P	18	AN	Yes
Package Weight		4	TEXT	No
Package Count		4	TEXT	No
Product Description		48	TEXT	No
Ship to Address		75	TEXT	No
Ship from Address		48	TEXT	No

Outer Shipping Container – Option 2

Format: AIAG**-B3
 Symbology: Code 39
 Density: 5.0 CPI
 Label Size: 4.0 inch x 6.5 inch(102mm x 165mm)

**Automobile Industry Action Group



Description	E.I.A.* ID	Max Char	Char Type	Bar Coated
Customer Part No.	P	14	AN	Yes
Quantity-in Package	Q	6	N	Yes
Vendor ID Number	V	9	AN	Yes
Vendor Serial (Pack) Number	S	9	AN	Yes
Lot ID Number	L	5	N	Yes
Vendor Name/Address		46	AN	No

Reel Label – Option 3

Format: Vitramon Standard
 Symbology: Code 39
 Density: 6.4 CPI
 Label Size: 2.0 inch x 3.0 inch (51mm x 76mm)



Description	E.I.A.* ID	Max Char	Char Type	Bar Coated
Customer Part No.	P	14	AN	Yes
Quantity – in Package	Q	6	N	Yes
Vendor ID Number	V	9	AN	Yes
Vendor Serial (Pack) Number	S	5	AN	Yes
Lot ID Number	L	5	N	Yes
Vendor Name/Address		46	AN	No

"Char Type" is designated as N = Numeric, AN = Alpha Numeric, or Text.

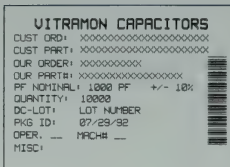
*Electronic Industries Association

PACKAGING

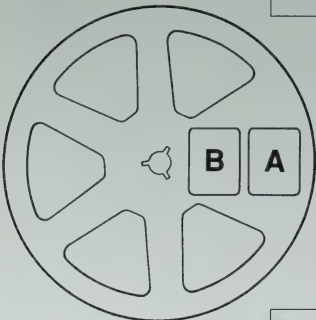
Marking of Vitramon Reels:

Each Vitramon reel has label (A).
Bar code labelling (B) is available upon request.

See Bar Code Label Standards on Page 25.



A.



B.



Capacitors with solder dipped terminations are not available in tape and reel packaging.

Tape and reel packaging is provided by customers request.
To specify 7" reel use "T" in part number. For 13" reel use "R" in part number.

Body Size	Tape Size	Approximate *Qty. Per Reel	
		7"	13"
0603	8 mm	4,000	10,000
0805	8 mm	2,500 - 4,000	10,000
0907	8 mm	2,500 - 4,000	10,000
1206	8 mm	2,500 - 4,000	10,000
1210	8 mm	2,500 - 4,000	10,000
1808	8 mm	2,500 - 3,500	10,000
1812	12 mm	2,000 - 3,000	5,000
1825	12 mm	1,000	5,000
2225	12 mm	1,000	5,000
3610	12 mm	500	2,500

*Actual quantity depends on chip thickness.

REFERENCE: EIA standard 481 – "Taping of Surface Mount Components for Automatic Placement."

VITRAMON uses embossed plastic tape and rigid plastic reels.
Cover tapes and reels are anti-static.

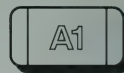
NOTE: 8mm punched paper tape is available upon request.

E.I.A. MARKING OPTIONS

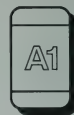


Example of coding: 10pF

All
Other
Sizes



0805
Size



LETTER

	0	1	2	3	4	5	6	7
A	1.0	10	100	1,000	10,000	100,000	1,000,000	10,000,000
B	1.1	11	110	1,100	11,000	110,000	1,100,000	11,000,000
C	1.2	12	120	1,200	12,000	120,000	1,200,000	12,000,000
D	1.3	13	130	1,300	13,000	130,000	1,300,000	13,000,000
E	1.5	15	150	1,500	15,000	150,000	1,500,000	15,000,000
F	1.6	16	160	1,600	16,000	160,000	1,600,000	—
G	1.8	18	180	1,800	18,000	180,000	1,800,000	—
H	2.0	20	200	2,000	20,000	200,000	2,000,000	—
J	2.2	22	220	2,200	22,000	220,000	2,200,000	—
K	2.4	24	240	2,400	24,000	240,000	2,400,000	—
L	2.7	27	270	2,700	27,000	270,000	2,700,000	—
M	3.0	30	300	3,000	30,000	300,000	3,000,000	—
N	3.3	33	330	3,300	33,000	330,000	3,300,000	—
P	3.6	36	360	3,600	36,000	360,000	3,600,000	—
Q	3.9	39	390	3,900	39,000	390,000	3,900,000	—
R	4.3	43	430	4,300	43,000	430,000	4,300,000	—
S	4.7	47	470	4,700	47,000	470,000	4,700,000	—
T	5.1	51	510	5,100	51,000	510,000	5,100,000	—
U	5.6	56	560	5,600	56,000	560,000	5,600,000	—
V	6.2	62	620	6,200	62,000	620,000	6,200,000	—
W	6.8	68	680	6,800	68,000	680,000	6,800,000	—
X	7.5	75	750	7,500	75,000	750,000	7,500,000	—
Y	8.2	82	820	8,200	82,000	820,000	8,200,000	—
Z	9.1	91	910	9,100	91,000	910,000	9,100,000	—
a	2.5	25	250	2,500	25,000	250,000	2,500,000	—
b	3.5	35	350	3,500	35,000	350,000	3,500,000	—
d	4.0	40	400	4,000	40,000	400,000	4,000,000	—
e	4.5	45	450	4,500	45,000	450,000	4,500,000	—
f	5.0	50	500	5,000	50,000	500,000	5,000,000	—
m	6.0	60	600	6,000	60,000	600,000	6,000,000	—
n	7.0	70	700	7,000	70,000	700,000	7,000,000	—
t	8.0	80	800	8,000	80,000	800,000	8,000,000	—
y	9.0	90	900	9,000	90,000	900,000	9,000,000	—

Marking appears in black ink or laser-marked legible contrast.
Illustrated above is an example of E.I.A. marking A1, which designates 10 pF capacitance. Chip marking is at customers option. If not specified "no mark" will be provided. Orientation of marking is vendor optional. Reference EIA 198.

Application Notes

1. Termination Selection:

- A. Our tin plate nickel barrier termination (Termination Code "X") is recommended for all attachment methods which use solder.
- B. Use silver palladium (Termination Code "F") for all installation methods other than solder, such as conductive epoxy, welding, etc.

2. Chip Size Verses Solder Profile:

- A. 0805, 1206, 1210 and 1812 may be used in all three solder systems shown in the Solder Profile Curves.
- B. Sizes 1825 and larger should be reflow or vapor phase soldered. Wave solder is not recommended for these larger chip capacitor body sizes.

3. Soldering Flux:

A mildly activated rosin flux is recommended.

4. Solder Type:

Sn60 or Sn62 is preferred.

5. Preheat:

Follow the soldering curves shown.

6. Soldering Techniques:

Reflow, wave or vapor phase systems are recommended.

Attachment by soldering iron is not recommended—however, if used, the following precautions should be followed:

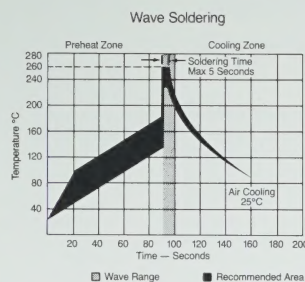
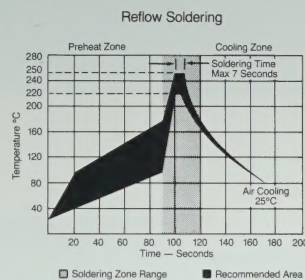
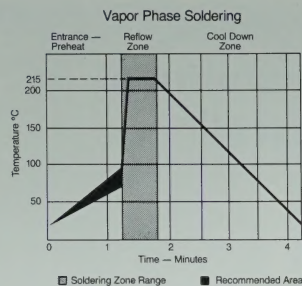
- A. Use a low wattage iron (30 watts maximum).
- B. Use the lowest tip temperature possible (280°C maximum).
- C. Use a soldering tip no greater than .120" (3mm) diameter.
- D. Preheat the chip capacitor to 150°C minimum.
- E. Do not touch the bare ceramic chip capacitor body with the soldering iron. Apply the heat through the solder (iron tip to mounting pad) or, if absolutely necessary, apply the iron tip to the chip termination metal.

7. Cooldown:

After soldering, allow the chip to cool at room ambient conditions, as an expedited cooldown (fans, cold cleaning solutions, etc.) could result in thermal shock cracking.

8. Cleaning:

Selection of an appropriate cleaning solvent is dependent upon the type of flux used. Cleaning in alcohol, water, hydrocarbons, or any of the common, halogenated degreaser solvents is not detrimental to our chip capacitors.



Vitramon®

Commitment to Excellence

VITRAMON*, Incorporated has been dedicated to the manufacture of high quality monolithic capacitors for industrial, consumer, medical and military users (using the VITRAMON* proprietary wet build-up process) since the company was incorporated in 1948.

We have placed particular emphasis on the monolithic ceramic chip capacitor—a critical circuit element in the expanding use of Surface Mounting Technology, as well as in traditional hybrid applications. Our North American manufacturing facilities are located in Monroe, Connecticut and Roanoke, Virginia.

VITRAMON* has long believed in providing a local source for consumers of ceramic capacitors worldwide. Accordingly, we operate manufacturing facilities in Germany, England, France and Brazil. These operations are augmented by sales offices in Australia and Japan.

VITRAMON* Realizes that Surface Mounted Technology requires a new level of quality of the components being utilized, both electrically and physically.

In anticipation of these needs, we have invested in new dielectric formulations, electrode alloy systems, and end termination compositions. Each step in the process uses statistical process control to insure we are consistently meeting customer needs. VITRAMON* is dedicated to never ending improvement.

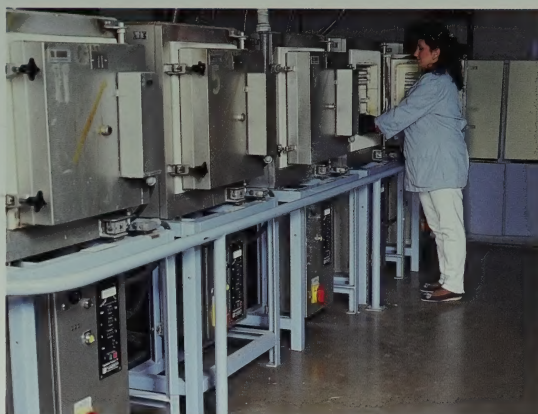
Our product line offers a variety of dielectrics which are available with a palladium/silver end termination or our barrier style termination. VITRAMON* is proud to have been one of the first to realize the need for a rugged barrier layer termination. Today VITRAMON* is one of the largest suppliers of plated barrier termination ceramic chip capacitors in North America.

We at VITRAMON*, Incorporated look forward to serving your ceramic chip capacitor needs.

**"VITRAMON" in this context refers to the organization developing, manufacturing and selling products under the name "VITRAMON" and other copyrighted trademarks.



Vitramon "wet build-up" process



Sintering



Cutting



Termination

Vitramon Incorporated

A subsidiary of Thomas & Betts Corporation
Monroe, CT (203) 268-6261 FAX: (203) 452-5670

9/92 PJ-15M

Thomas & Betts
